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EXHIBIT 3

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Planning Board
Grafton, MA

Stormwater Report
“Providence Village”
274 Providence Road
Grafton, MA

Date: February 26, 2020

Prepared For:
Providence Street Village Inc.
81 Camp Street
Milford, MA 01757

Prepared By:
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G&H Project G-10174

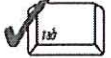




Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the [Massachusetts Stormwater Handbook](#). The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.¹ This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8²
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the [Massachusetts Stormwater Handbook](#). The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the [Massachusetts Stormwater Handbook](#).

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

¹ The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

² For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

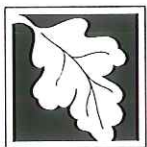


Elizabeth A. Mainini-Sanchioni 2/14/20
Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

- ☒ New development
☐ Redevelopment
☐ Mix of New Development and Redevelopment



Checklist for Stormwater Report

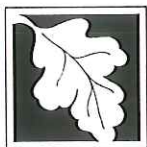
Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☒ No disturbance to any Wetland Resource Areas
- ☒ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☒ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
 - ☐ Credit 1
 - ☐ Credit 2
 - ☐ Credit 3
- ☐ Use of "country drainage" versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): _____

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☐ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



Checklist for Stormwater Report

Checklist (continued)

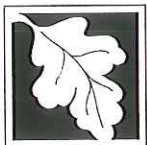
Standard 2: Peak Rate Attenuation

- ☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- ☒ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- ☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

- ☒ Soil Analysis provided.
- ☒ Required Recharge Volume calculation provided.
- ☐ Required Recharge volume reduced through use of the LID site Design Credits.
- ☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.
 - ☒ Static
 - ☐ Simple Dynamic
 - ☐ Dynamic Field¹
- ☒ Runoff from all impervious areas at the site discharging to the infiltration BMP.
- ☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- ☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- ☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
 - ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
 - ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
 - ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
 - ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- ☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- ☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

¹ 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



Checklist for Stormwater Report

Checklist (continued)

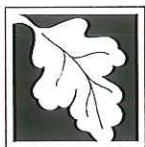
Standard 3: Recharge (continued)

- ☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- ☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
 - Provisions for storing materials and waste products inside or under cover;
 - Vehicle washing controls;
 - Requirements for routine inspections and maintenance of stormwater BMPs;
 - Spill prevention and response plans;
 - Provisions for maintenance of lawns, gardens, and other landscaped areas;
 - Requirements for storage and use of fertilizers, herbicides, and pesticides;
 - Pet waste management provisions;
 - Provisions for operation and management of septic systems;
 - Provisions for solid waste management;
 - Snow disposal and plowing plans relative to Wetland Resource Areas;
 - Winter Road Salt and/or Sand Use and Storage restrictions;
 - Street sweeping schedules;
 - Provisions for prevention of illicit discharges to the stormwater management system;
 - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
 - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
 - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- ☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
 - ☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
 - ☐ is within the Zone II or Interim Wellhead Protection Area
 - ☐ is near or to other critical areas
 - ☒ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
 - ☐ involves runoff from land uses with higher potential pollutant loads.
 - ☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.
 - ☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

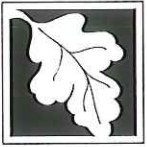
- ☒ The BMP is sized (and calculations provided) based on:
 - ☒ The ½" or 1" Water Quality Volume or
 - ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- ☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- ☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- ☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- ☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted *prior to* the discharge of stormwater to the post-construction stormwater BMPs.
- ☐ The NPDES Multi-Sector General Permit does *not* cover the land use.
- ☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- ☐ All exposure has been eliminated.
- ☐ All exposure has *not* been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- ☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

- ☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- ☐ Critical areas and BMPs are identified in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- ☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
 - ☐ Limited Project
 - ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
 - ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
 - ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
 - ☐ Bike Path and/or Foot Path
 - ☐ Redevelopment Project
 - ☐ Redevelopment portion of mix of new and redevelopment.
- ☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- ☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
 - Construction Period Operation and Maintenance Plan;
 - Names of Persons or Entity Responsible for Plan Compliance;
 - Construction Period Pollution Prevention Measures;
 - Erosion and Sedimentation Control Plan Drawings;
 - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
 - Vegetation Planning;
 - Site Development Plan;
 - Construction Sequencing Plan;
 - Sequencing of Erosion and Sedimentation Controls;
 - Operation and Maintenance of Erosion and Sedimentation Controls;
 - Inspection Schedule;
 - Maintenance Schedule;
 - Inspection and Maintenance Log Form.
- ☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- ☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- ☒ The project is **not** covered by a NPDES Construction General Permit.
- ☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- ☐ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

- ☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
 - ☒ Name of the stormwater management system owners;
 - ☒ Party responsible for operation and maintenance;
 - ☒ Schedule for implementation of routine and non-routine maintenance tasks;
 - ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
 - ☒ Description and delineation of public safety features;
 - ☒ Estimated operation and maintenance budget; and
 - ☒ Operation and Maintenance Log Form.
- ☐ The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
 - ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
 - ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

- ☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- ☒ An Illicit Discharge Compliance Statement is attached;
- ☐ NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.

Project Description

The proposed project located at 274 Providence Road consists of constructing an eight-unit townhouse style multifamily dwelling located in the village mixed use district. The proposal includes the construction of an 8 unit 6,120 square foot dwelling, utilities and associated parking areas. Each unit will have a garage and one exterior parking space.

The 36,134 square foot property currently consists of a single family wood frame house and detached single car wood frame garage. Vegetation on site consists of bushes and overgrown grass with some trees. The house and garage will be demolished to provide room for the new construction. The existing building is served by town sewer and town water. A new water connection will be made into Providence Road and the existing sewer service will be used for the sewer connection to the new building.

Stormwater runoff will be treated and attenuated by a standard catch basin to manhole collection system. This system connects to a subsurface infiltration chamber system. The primary soil onsite is a Hinkley loamy sand, which is a well-drained soil belonging to hydrologic group A. There are no wetlands within 100-feet of the proposed project.

Compliance with the 10 Stormwater Standards

Standard 1: No new untreated Discharges

The proposed stormwater system does not result in any new stormwater discharges. Due to the well-drained nature of the soil and the very flat topography of the site, there is currently very little runoff leaving the site during the 2 and 10 year storm. These storms are captured and infiltrated onsite for these storms in post development. The majority of impervious pavement is collected and discharged to a hydrodynamic separator, appropriately sized to treat for 80% TSS removal, prior to discharge to the existing drainage system in Houghton Street. Finally, the clean roof drainage will be collected and discharged to a proposed underground infiltration basin.

Standard 2: Peak Rate Attenuation

Stormwater from the existing site generally flows from west and east to the center of the site. Runoff starts at Main Street and flows downhill quickly but levels out for the remainder of the site. Flow generally does not leave the site.

HydroCAD, a stormwater design program based on TR-55, was used to evaluate the pre-development and post development peak discharge rates for the 2, 10, 25 and 100 year 24-hour storm events. The rainfalls associated with the storms (3.2, 4.7, 5.3 and 6.7 inches for the 2, 10, 25 and 100-year storms respectively), were entered into HydroCAD.

The HydroCAD model also requires information regarding the site. The existing conditions, or Pre-Development condition, were model using one watershed to model the stormwater being discharged to the existing drainage in Providence Road. In order to get an accurate model of the stormwater infiltration and surface flows, the underlying soils, surface cover and slopes are considered. The NRCS Soil Survey for the site, included in Appendix 2, depicts the main soil as a Hinkley loamy sand classified as a hydrologic group A. The existing soils are depicted relative to the surface cover,

defined watershed areas and corresponding Time-of-Concentrations on the Pre-Development Drainage Plan in Appendix 10.

The post development condition was evaluated using one watershed area consisting of the property boundaries. Due to the flat nature of the neighborhood and well drained soils, runoff generally does not enter the site. Post Development Watershed Area No. 1 includes stormwater collected from the roof of the proposed building being discharged to the infiltration system. The Post-Development Drainage Plan, including defined watershed areas and corresponding Time-of-Concentrations, is included in Appendix 10.

In order to meet the Pre-Development peak discharge rates, a subsurface infiltration chamber basin is included in the design to attenuate stormwater flows. The following table lists the Pre and Post Development peak flows for each of the design storms at Providence Road. The detailed HydroCAD report included in Appendix 4 includes the calculations demonstrating the Post-Development peak flows do not exceed the Pre-Development peak flows.

Table 1: Peak Rate Attenuation Summary

	2-yr Storm	10-yr Storm	25-yr Storm	100-yr Storm
Flow off site				
Pre-Development	0.00 cfs	0.00 cfs	0.01 cfs	0.09 cfs
Post-Development	0.00 cfs	0.00 cfs	0.00 cfs	0.00 cfs

Standard 3: Recharge

Soil Evaluation

Soil evaluation is broken down into two stages. Stage 1 identifies the underlying soils just beneath the surface that contribute to how much runoff is generated as stormwater falls and moves across the surface. Stage 2 evaluates the soils in direct contact with the proposed infiltration BMPs. Appendix 2 includes the NRCS Soil Survey used for Stage 1 while Appendix 3 includes the on-site soil textural analysis in the specific locations that infiltration is proposed. The soils encountered were loamy sands, which are well drained and suitable for infiltration systems. The information from the NRCS Soil Survey and the on-site soil textural analysis are included on the Pre and Post Development Drainage Plans in Appendix 10.

Recharge Volume

The required recharge volume is determined by calculating the impervious area proposed over the corresponding soil identified in the NRCS Soil Survey. As previously stated, the NRCS Soil Survey lists the site as a Hinkley loamy sand, which is a well-drained soil belonging to hydrologic group A. The recharge volume was calculated for the total impervious area.

Table 2: Required Recharge Volume Calculation

	Recharge	Impervious	Volume
Hydrologic Group	(in/sqft)	(sq ft)	(cf)
A - sand	0.60	17,044 sf	852.2
B - loam	0.35	None	0
C - silty loam	0.25	None	0
D - clay	0.10	None	0
Required Recharge Volume Total			852.2 cf

Stormwater Basin Sizing

There are three ways of determining the recharge volume provided by a stormwater basin (Static, Simple Dynamic and Dynamic Field). The Static Method, used here, includes the volume of water that can be stored beneath the lowest outlet of the basin. This, the most conservative method of determining the recharge volume, doesn't account for any infiltration that takes place while the basin is filling with water and is less dependent on maintenance of the basin since the only way for the water below the lowest invert can leave the basin is through infiltration. The following table summarizes the recharge volume provided by the infiltration basin.

Table 3: Basin Recharge Volumes

	Recharge Volume
Chambers	4,839 cf
Total	4,839 cf

72-hour Drawdown

When using the conservative Static Method to determine infiltration volume provided, the Rawls Rate is used to represent the infiltration rate in place of a hydraulic conductivity rate. The specific rate chosen is based on the textural analysis of the in-site soil performed by a competent soil professional.

A Massachusetts Certified Soil Evaluator performed an evaluation of the soil at the proposed infiltration BMP. The soil textural analysis for the infiltration BMP is listed below with the associated Rawls Rate used in the HydroCAD calculations.

Table 4: Rawls Rate

	Most Restrictive Soil Texture	Rawls Rate (in/hour)
	Loamy Sand	2.41 in/hr

Drawdown time for the infiltration basin is modeled by HydroCAD and included in Appendix 5. The following table summarizes the drawdown time for the basin to show it will drawdown within the 72-hour maximum.

Table 5: Basin Drawdown

	Time for Drawdown
Basin A	27.5 hours

Standard 4: Water Quality

Water Quality Volume

The required water quality volume is determined through a calculation of the proposed impervious pavement throughout the site and a determination of whether the site is located in a critical area or the proposed use is considered to produce a high pollutant load. As noted in Standard 5, the land use does not qualify as a use with high pollutant load and, as noted in Standard 6, no critical area was identified for this site. The water quality volume is, therefore, calculated at one-half inch over the area of proposed impervious pavement. Since roof runoff is considered clean and not considered to contribute contaminants to stormwater runoff and is being directly infiltrated, the impervious areas associated with the roof is not included in the required water quality volume.

The area of impervious pavement within the proposed site is calculated from the information entered into HydroCAD and can be found in Appendix 4. One-half inch across 10,708 square feet of new impervious pavement requires a water quality volume of 446 cubic feet.

Removal of Total Suspended Solids

The water quality volume, as calculated in the previous section, is treated through "Treatment Trains" to provide a minimum of 80-percent TSS removal. The TSS Removal Worksheets are included in Appendix 7 for the proposed treatment train. All the new impervious area is collected by deep sump catch basins and discharged to a water quality unit for pretreatment. The WQU in conjunction with the deep sump hooded catch basins complete the treatment trains at a minimum of 80 percent TSS respectively.

All the stormwater from the impervious pavement is collected and discharged to the proposed water quality unit which is sized to treat the full water quality volume of 446 cubic feet.

Standard 5: Land Uses with Higher Potential Pollutant Loads

The proposed project is considered a residential use and does not qualify as a LUHPPL.

Standard 6: Critical Areas

The proposed project is not within, nor does it discharge stormwater to an identified Critical Area.

Standard 7: Redevelopment Project

The proposed project is not considered a redevelopment project.

Standard 8: Construction Period Controls

While the project area is not subject to jurisdiction under the Massachusetts Wetland Protection Act, it is subject to protection under the local Stormwater regulations. In accordance with the local regulations, the Stormwater Report is being submitted to the Planning Board for review. The Construction Period Pollution Control Plan included in Appendix 8 will be followed to prevent discharge of erosion to the existing drainage system in Providence Road and other abutting properties.

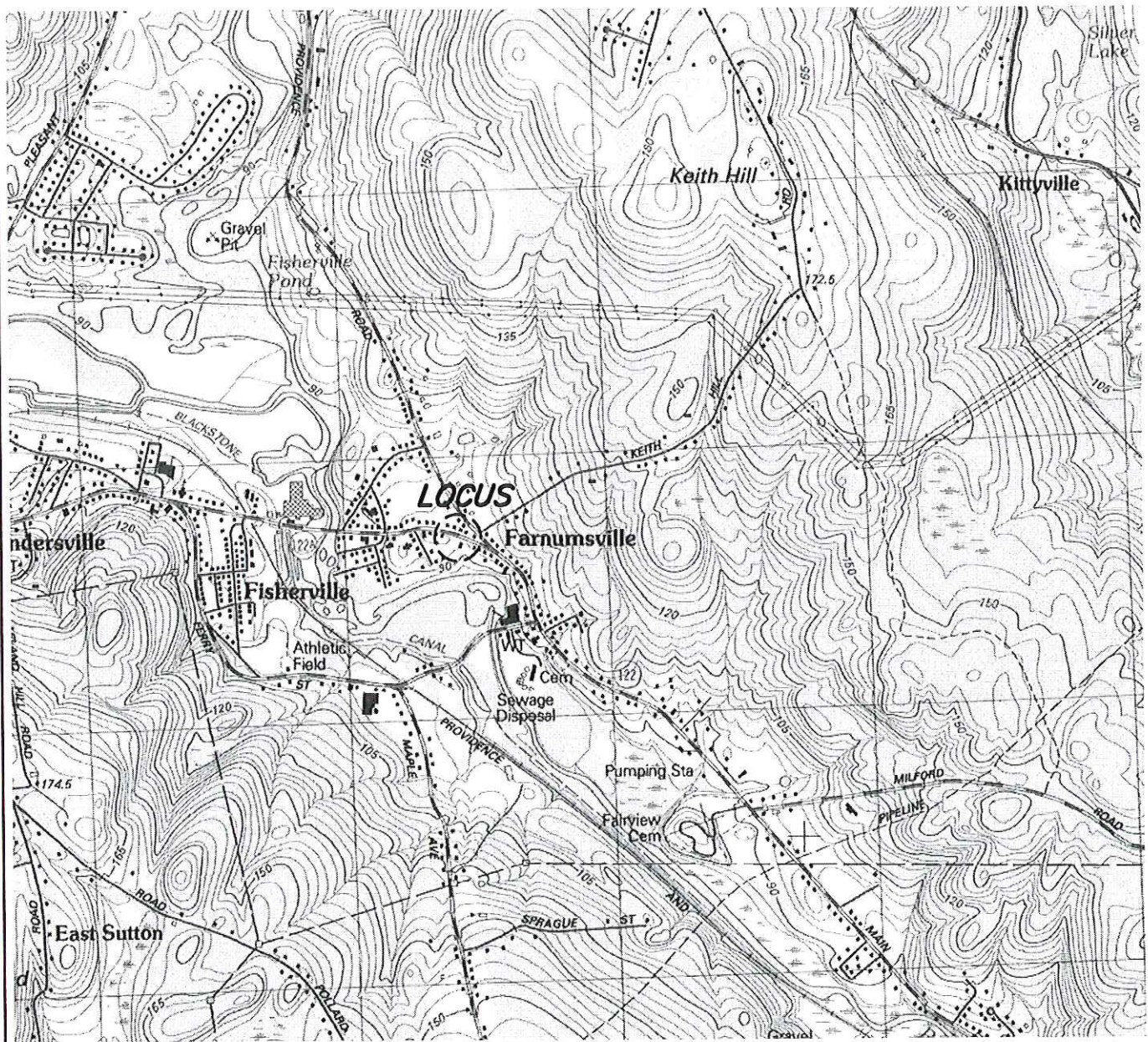
Standard 9: Operation and Maintenance Plan

The Operation and Maintenance Plan included in Appendix 7 address the responsibilities of maintaining the stormwater BMPs.

Standard 10: Illicit Discharges to Drainage System

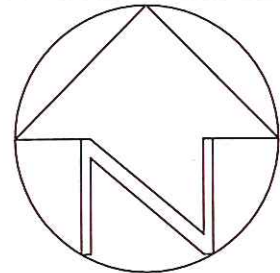
It is the intent of the developer to follow the Construction Period Pollution Prevention Control Plan and the Order of Conditions to mitigate the affects of the proposed project on the adjacent environment. Following completion of construction, the Operation and Maintenance Plan will be provided to the property manager who will continue, the maintenance of the project. The Illicit Discharge Statement is included in Appendix 9.

Locus Map
Appendix 1



U.S.G.S.
Quadrangle

Scale: 1"=2000'



LOCUS MAP
274 PROVIDENCE ROAD
Grafton, Massachusetts



**Guerriere
&
Halnon, Inc.**

Engineering & Land Surveying
333 WEST STREET, MILFORD, MA 01757
(508) 473-6630 FAX: (508) 473-8243
WWW.GUERRIEREANDHALNON.COM

DATE: Jan 3 2020

PAGE: 1 OF 1

NRCS Soils Report
Appendix 2

Worcester County, Massachusetts, Southern Part

245B—Hinckley loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2svm8

Elevation: 0 to 1,430 feet

Mean annual precipitation: 36 to 53 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 250 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Hinckley and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Outwash plains, outwash deltas, eskers, moraines, kame terraces, kames, outwash terraces

Landform position (two-dimensional): Summit, shoulder, backslope, footslope

Landform position (three-dimensional): Nose slope, side slope, base slope, crest, tread, riser

Down-slope shape: Linear, convex, concave

Across-slope shape: Convex, linear, concave

Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 8 inches: loamy sand

Bw1 - 8 to 11 inches: gravelly loamy sand

Bw2 - 11 to 16 inches: gravelly loamy sand

BC - 16 to 19 inches: very gravelly loamy sand

C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Excessively drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water storage in profile: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3s

Hydrologic Soil Group: A

Hydric soil rating: No

Minor Components

Windsor

Percent of map unit: 8 percent

Landform: Kames, eskers, moraines, outwash terraces, outwash
deltas, kame terraces, outwash plains

Landform position (two-dimensional): Summit, shoulder,
backslope, footslope

Landform position (three-dimensional): Nose slope, side slope,
base slope, crest, riser, tread

Down-slope shape: Linear, convex, concave

Across-slope shape: Convex, linear, concave

Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent

Landform: Kame terraces, outwash plains, moraines, outwash
terraces, outwash deltas

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Side slope, base slope,
head slope, tread

Down-slope shape: Concave, linear

Across-slope shape: Linear, concave

Hydric soil rating: No

Agawam

Percent of map unit: 2 percent

Landform: Eskers, moraines, outwash terraces, outwash deltas,
kame terraces, outwash plains, kames

Landform position (two-dimensional): Summit, shoulder,
backslope, footslope

Landform position (three-dimensional): Nose slope, side slope,
base slope, crest, riser, tread

Down-slope shape: Linear, convex, concave

Across-slope shape: Convex, linear, concave

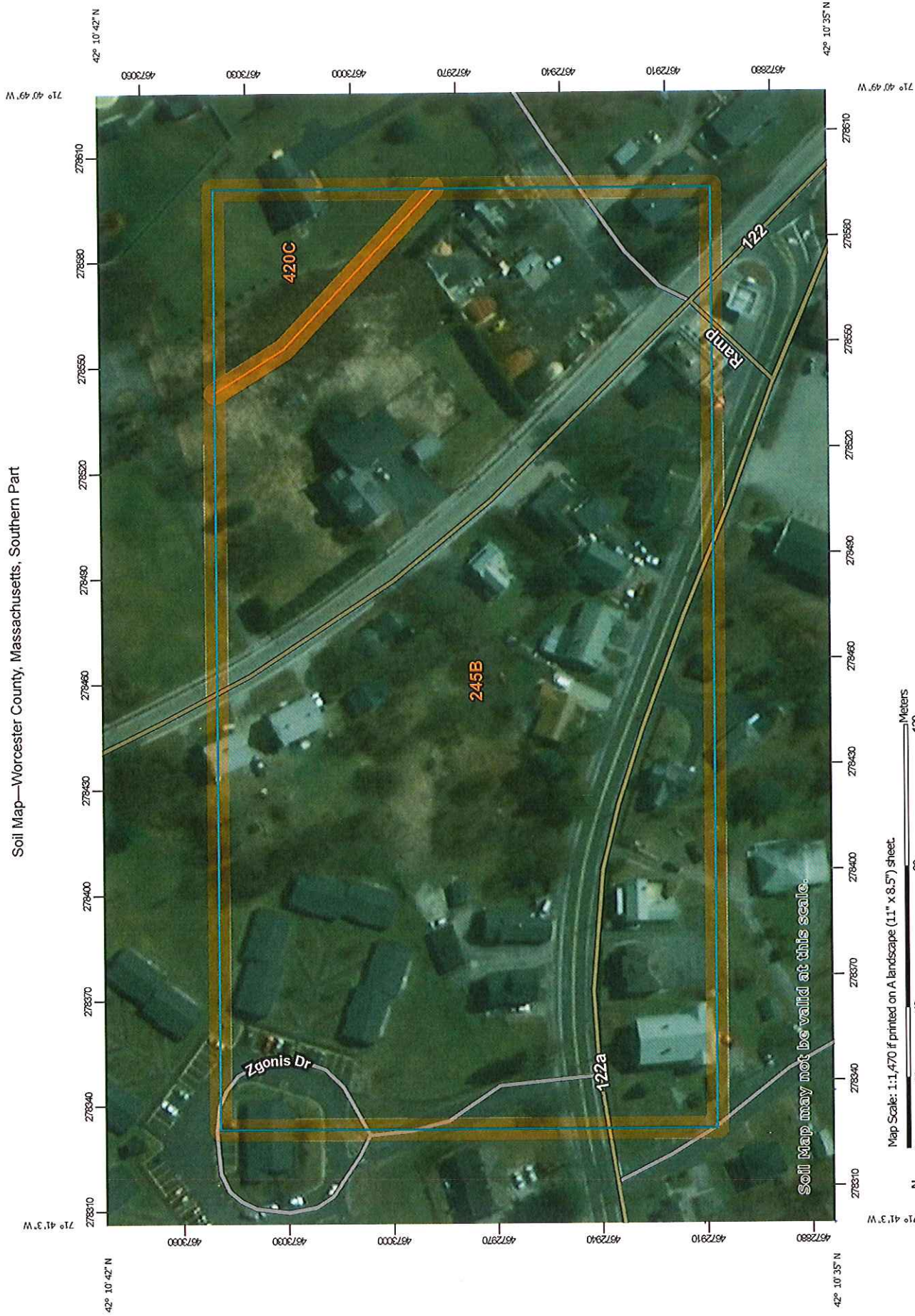
Hydric soil rating: No

Data Source Information

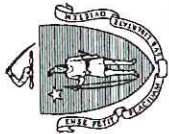
Soil Survey Area: Worcester County, Massachusetts, Southern Part

Survey Area Data: Version 11, Sep 11, 2018

Soil Map—Worcester County, Massachusetts, Southern Part



Field Soils Evaluation
Appendix 3



Commonwealth of Massachusetts
City/Town of 1

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

274 Providence Road LLC
Owner Name
274 Providence Road
Street Address
Grafton MA
City State
01519
Map/Lot #
Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair

2. Soil Survey Available? ☒ Yes ☐ No If yes:

NRCS Source 245B Soil Map Unit

Hinckley Loamy Sand
Soil Name

Soil Limitations

Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Outwash plains, outwash deltas, eskers, moraines, kame terraces, kames, outwash terraces
Landform

3. Surficial Geological Report Available? ☐ Yes ☐ No If yes:

Year Published/Source Map Unit

Description of Geologic Map Unit:

4. Flood Rate Insurance Map Within a regulatory floodway? ☐ Yes ☒ No

5. Within a velocity zone? ☐ Yes ☐ No

6. Within a Mapped Wetland Area? ☐ Yes ☒ No

If yes, MassGIS Wetland Data Layer:

7. Current Water Resource Conditions (USGS):

Range: ☐ Above Normal ☒ Normal ☐ Below Normal

Wetland Type

8. Other references reviewed:



Commonwealth of Massachusetts
City/Town of 1

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: 1 Hole # 1 Date 9/5/19 Time none Weather none Latitude 1 Longitude: 1
Slope (%) 1

1. Land Use vacant property
(e.g., woodland, agricultural field, vacant lot, etc.)
Vegetation tall grass and brush
Surface Stones (e.g., cobbles, stones, boulders, etc.) none

Description of Location: _____

2. Soil Parent Material: _____ Landform _____
Position on Landscape (SU, SH, BS, FS, TS) _____
Drainage Way _____ feet Wetlands _____ feet
Drinking Water Well _____ feet Other _____ feet

3. Distances from: _____
Open Water Body _____ feet
Property Line _____ feet
If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

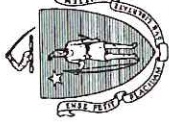
4. Unsuitable Materials Present: ☐ Yes ☒ No
If yes: _____ Depth Weeping from Pit _____ Depth Standing Water in Hole _____

5. Groundwater Observed: ☐ Yes ☒ No

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-8	A	LS	10YR3/2						Granular	Friable	
8-16	Bw	LS	10YR4/3						Massive		
16-120	C	LS	10YR5/4								

Additional Notes:
No mottles No ground water



Commonwealth of Massachusetts
City/Town of 1

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: 2 Hole # 9/5/19 Date 9/5/19 Time _____ Weather _____ Latitude _____ Longitude: _____
1

1. Land Use: vacant property
(e.g., woodland, agricultural field, vacant lot, etc.)

Description of Location: _____

2. Soil Parent Material: _____ Landform _____ Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from: Open Water Body _____ feet
Property Line _____ feet
Drainage Way _____ feet
Drinking Water Well _____ feet
Wetlands _____ feet
Other _____ feet

4. Unsuitable Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock
5. Groundwater Observed: ☐ Yes ☒ No If yes: _____ Depth Weeping from Pit _____ Depth Standing Water in Hole _____

Soil Log

Soil Log												
Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other	
				Depth	Color	Percent	Gravel	Cobbles & Stones				
0-10	A	LS	10YR3/2						Granular	Friable		
10-20	Bw	LS	10YR4/3						Massive	Friable		
20-126	C	LS	10YR5/4									

Additional Notes:
No mottles No ground water



Commonwealth of Massachusetts
City/Town of 1

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

- ☐ Depth observed standing water in observation hole
- ☐ Depth weeping from side of observation hole
- ☐ Depth to soil redoximorphic features (mottles)
- ☐ Depth to adjusted seasonal high groundwater (S_h) (USGS methodology)

Obs. Hole #1 _____ inches

Obs. Hole #2 _____ inches

_____ inches

_____ inches

_____ inches

Index Well Number _____ Reading Date _____

$$S_h = S_c - [S_r \times (OW_c - OW_{max}) / OW_r]$$

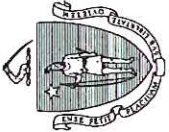
Obs. Hole/Well# _____ S_c _____ S_r _____ OW_c _____ OW_{max} _____ OW_r _____ S_h _____

2. Estimated Depth to High Groundwater: >120 inches

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

- a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? ☒ Yes ☐ No
- b. If yes, at what depth was it observed (exclude A and O Horizons)? Upper boundary: _____ inches Lower boundary: _____ inches
- c. If no, at what depth was impervious material observed? Upper boundary: _____ inches Lower boundary: _____ inches



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator

Date

Typed or Printed Name of Soil Evaluator / License #

Expiration Date of License

Name of Approving Authority Witness

Approving Authority

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Field Diagrams: Use this area for field diagrams:

HydroCAD Calculations
Appendix 4



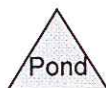
Predevelopment



Postdevelopment

Infiltrators

Design point



Routing Diagram for G-10174 Pre Post Drainage Claro
Prepared by {enter your company name here}, Printed 1/7/2020
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G-10174 Pre Post Drainage Claro

Prepared by {enter your company name here}

Printed 1/7/2020

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.338	39	>75% Grass cover, Good, HSG A (2S)
0.224	98	Paved parking, HSG A (1S, 2S)
0.034	98	Paved parking, HSG A sidewalk (2S)
0.182	98	Unconnected roofs, HSG A (1S, 2S)
0.100	30	Woods, Good, HSG A (2S)
0.781	32	Woods/grass comb., Good, HSG A (1S)
1.659	51	TOTAL AREA

G-10174 Pre Post Drainage Claro

Type III 24-hr 2 year Rainfall=3.20"

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Time span=5.00-72.00 hrs, dt=0.05 hrs, 1341 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Predevelopment

Runoff Area=36,135 sf 5.81% Impervious Runoff Depth=0.00"

Tc=6.0 min UI Adjusted CN=34 Runoff=0.00 cfs 0.000 af

Subcatchment 2S: Postdevelopment

Runoff Area=36,135 sf 47.17% Impervious Runoff Depth=0.64"

Tc=6.0 min CN=66 Runoff=0.50 cfs 0.044 af

Reach 3R: Design point**Pond 4P: Infiltrators**

Peak Elev=97.94' Storage=388 cf Inflow=0.50 cfs 0.044 af

Outflow=0.13 cfs 0.044 af

Total Runoff Area = 1.659 ac Runoff Volume = 0.044 af Average Runoff Depth = 0.32"**73.51% Pervious = 1.220 ac 26.49% Impervious = 0.439 ac**

G-10174 Pre Post Drainage Claro

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Type III 24-hr 2 year Rainfall=3.20"

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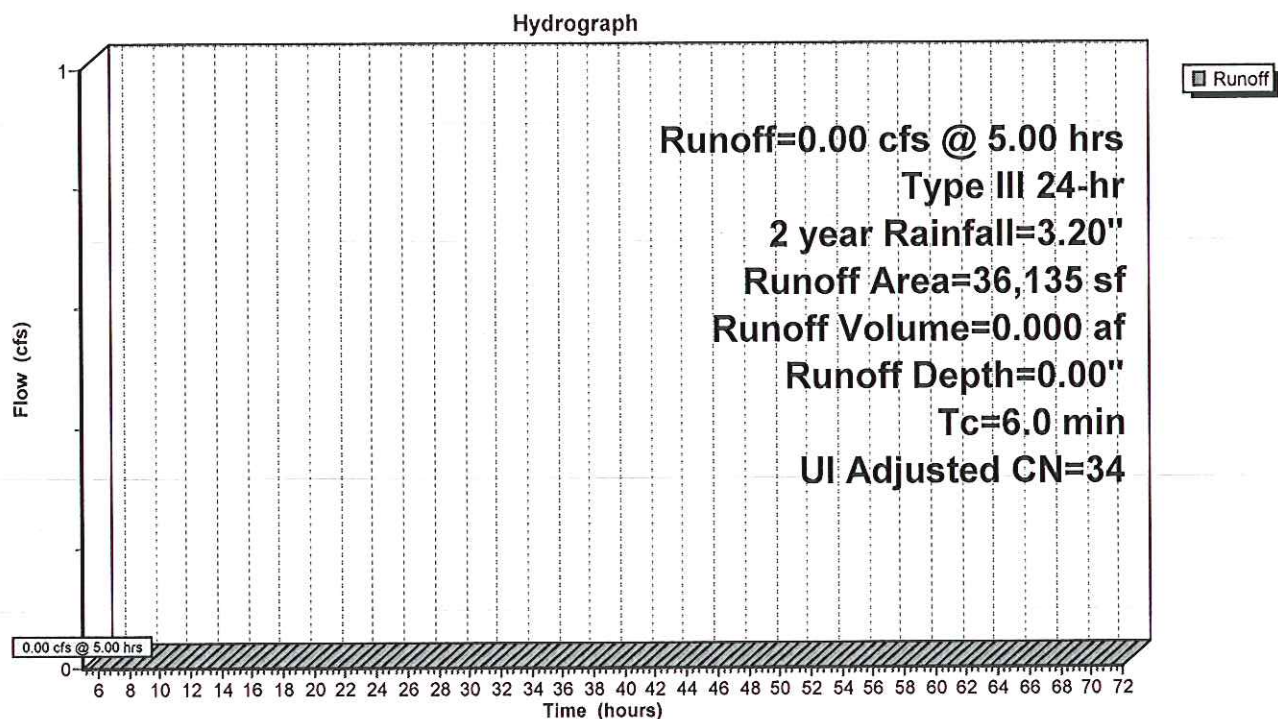
Summary for Subcatchment 1S: Predevelopment

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.20"

Area (sf)	CN	Adj	Description
34,035	32		Woods/grass comb., Good, HSG A
1,000	98		Unconnected roofs, HSG A
600	98		Unconnected roofs, HSG A
500	98		Paved parking, HSG A
36,135	36	34	Weighted Average, UI Adjusted
34,035			94.19% Pervious Area
2,100			5.81% Impervious Area
1,600			76.19% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: Predevelopment

G-10174 Pre Post Drainage Claro

Type III 24-hr 2 year Rainfall=3.20"

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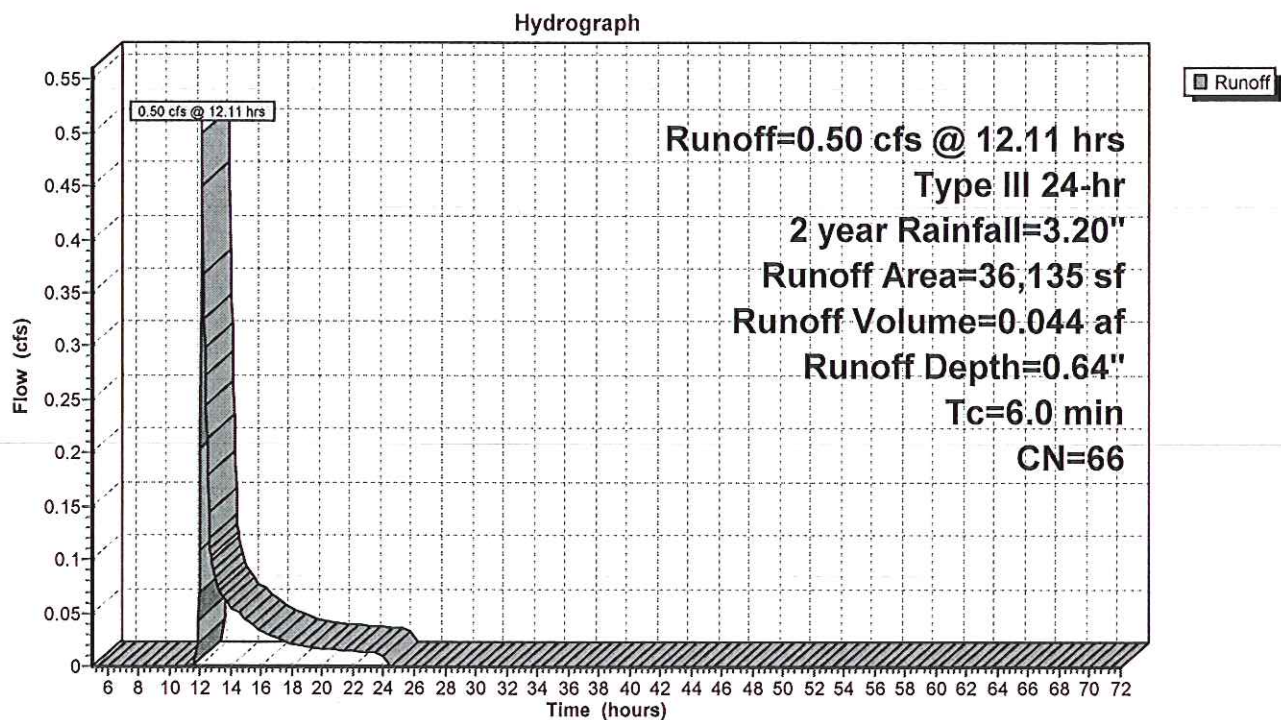
Summary for Subcatchment 2S: Postdevelopment

Runoff = 0.50 cfs @ 12.11 hrs, Volume= 0.044 af, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.20"

Area (sf)	CN	Description
6,336	98	Unconnected roofs, HSG A
9,236	98	Paved parking, HSG A
* 1,472	98	Paved parking, HSG A sidewalk
14,741	39	>75% Grass cover, Good, HSG A
4,350	30	Woods, Good, HSG A
36,135	66	Weighted Average
19,091		52.83% Pervious Area
17,044		47.17% Impervious Area
6,336		37.17% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 2S: Postdevelopment

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Type III 24-hr 2 year Rainfall=3.20"

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Summary for Reach 3R: Design point

Inflow Area = 0.830 ac, 47.17% Impervious, Inflow Depth = 0.00" for 2 year event

Routing by Stor-Ind+Trans method

G-10174 Pre Post Drainage Claro

Type III 24-hr 2 year Rainfall=3.20"

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Summary for Pond 4P: Infiltrators

Inflow Area = 0.830 ac, 47.17% Impervious, Inflow Depth = 0.64" for 2 year event
 Inflow = 0.50 cfs @ 12.11 hrs, Volume= 0.044 af
 Outflow = 0.13 cfs @ 12.58 hrs, Volume= 0.044 af, Atten= 74%, Lag= 28.0 min
 Discarded = 0.13 cfs @ 12.58 hrs, Volume= 0.044 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 97.94' @ 12.58 hrs Surf.Area= 2,195 sf Storage= 388 cf

Plug-Flow detention time= 19.4 min calculated for 0.044 af (100% of inflow)
 Center-of-Mass det. time= 19.4 min (910.5 - 891.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	97.50'	1,955 cf	33.00'W x 66.50'L x 3.54'H Field A 7,772 cf Overall - 2,884 cf Embedded = 4,889 cf x 40.0% Voids
#2A	98.00'	2,884 cf	Cultec R-330XLHD x 54 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
		4,839 cf	Total Available Storage

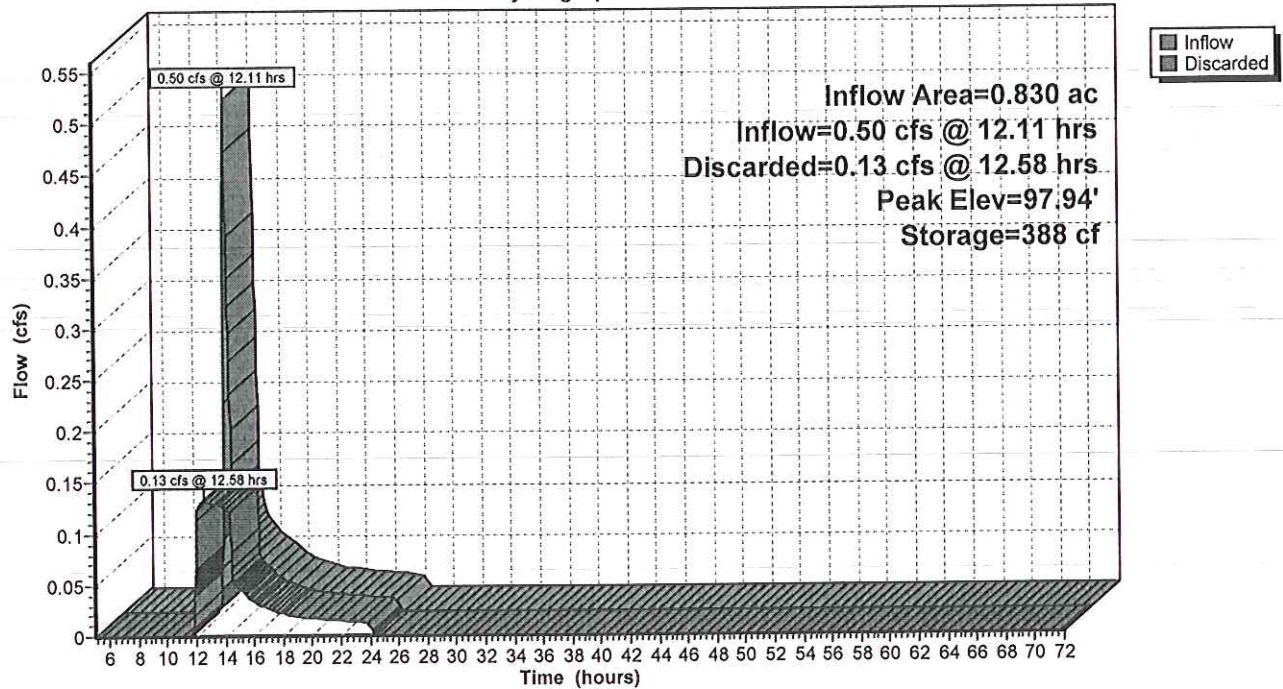
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	97.50'	2.410 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 91.50'

Discarded OutFlow Max=0.13 cfs @ 12.58 hrs HW=97.94' (Free Discharge)
 ↑1=Exfiltration (Controls 0.13 cfs)

Pond 4P: Infiltrators

Hydrograph



G-10174 Pre Post Drainage Claro

Type III 24-hr 10 year Rainfall=4.70"

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Time span=5.00-72.00 hrs, dt=0.05 hrs, 1341 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Predevelopment

Runoff Area=36,135 sf 5.81% Impervious Runoff Depth=0.03"

Tc=6.0 min UI Adjusted CN=34 Runoff=0.00 cfs 0.002 af

Subcatchment 2S: Postdevelopment

Runoff Area=36,135 sf 47.17% Impervious Runoff Depth=1.53"

Tc=6.0 min CN=66 Runoff=1.39 cfs 0.106 af

Reach 3R: Design point**Pond 4P: Infiltrators**

Peak Elev=98.69' Storage=1,671 cf Inflow=1.39 cfs 0.106 af

Outflow=0.15 cfs 0.106 af

Total Runoff Area = 1.659 ac Runoff Volume = 0.108 af Average Runoff Depth = 0.78"**73.51% Pervious = 1.220 ac 26.49% Impervious = 0.439 ac**

G-10174 Pre Post Drainage Claro

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Type III 24-hr 10 year Rainfall=4.70"

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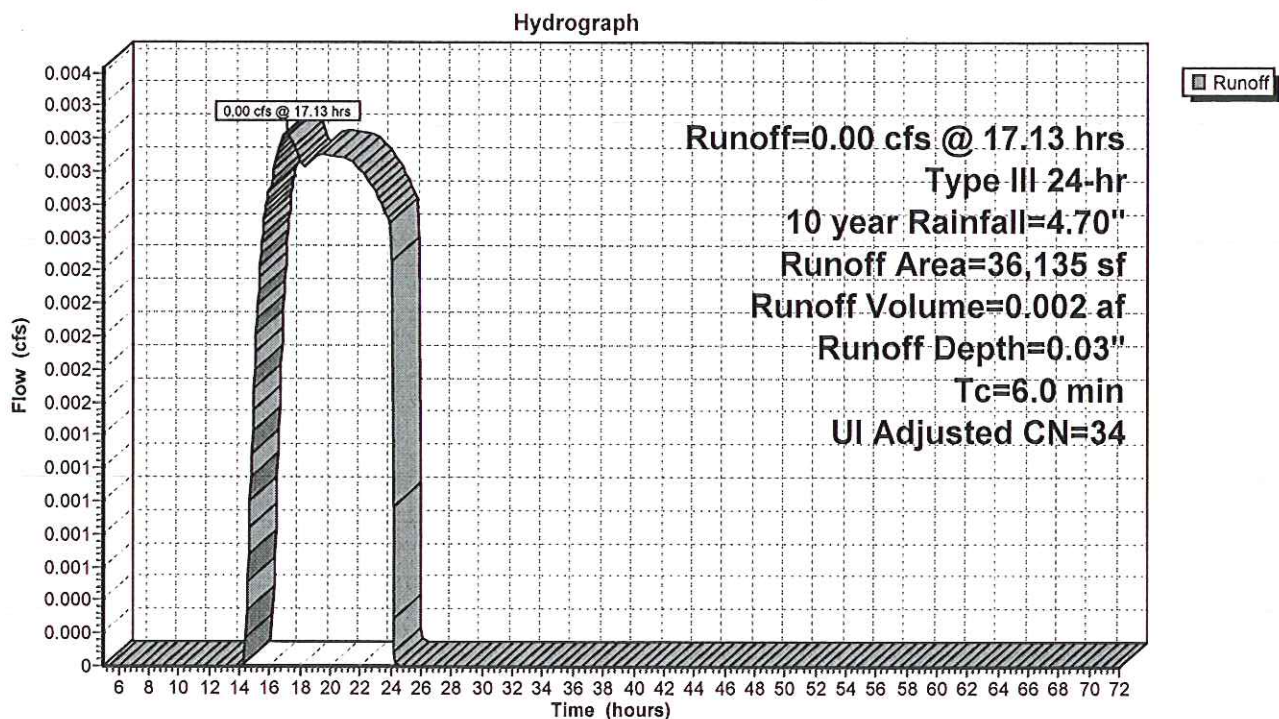
Summary for Subcatchment 1S: Predevelopment

Runoff = 0.00 cfs @ 17.13 hrs, Volume= 0.002 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=4.70"

Area (sf)	CN	Adj	Description
34,035	32		Woods/grass comb., Good, HSG A
1,000	98		Unconnected roofs, HSG A
600	98		Unconnected roofs, HSG A
500	98		Paved parking, HSG A
36,135	36	34	Weighted Average, UI Adjusted
34,035			94.19% Pervious Area
2,100			5.81% Impervious Area
1,600			76.19% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: Predevelopment

G-10174 Pre Post Drainage Claro

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Type III 24-hr 10 year Rainfall=4.70"

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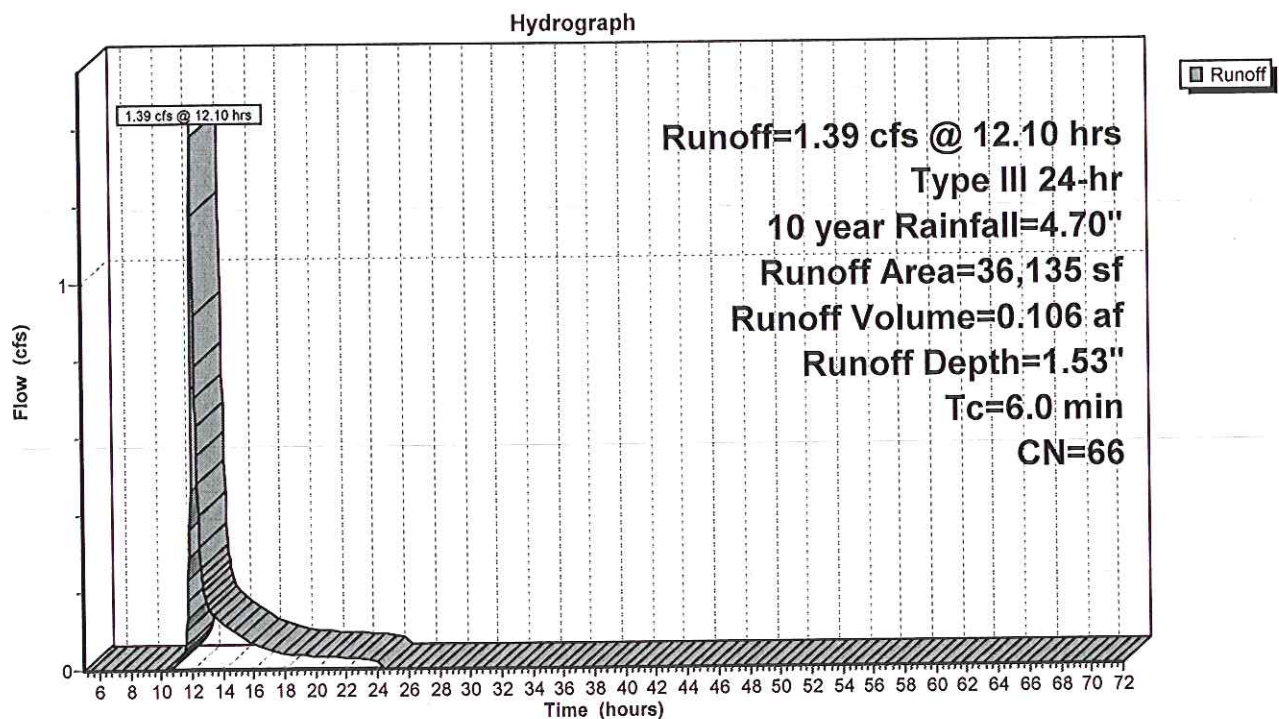
Summary for Subcatchment 2S: Postdevelopment

Runoff = 1.39 cfs @ 12.10 hrs, Volume= 0.106 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=4.70"

Area (sf)	CN	Description
6,336	98	Unconnected roofs, HSG A
9,236	98	Paved parking, HSG A
* 1,472	98	Paved parking, HSG A sidewalk
14,741	39	>75% Grass cover, Good, HSG A
4,350	30	Woods, Good, HSG A
36,135	66	Weighted Average
19,091		52.83% Pervious Area
17,044		47.17% Impervious Area
6,336		37.17% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 2S: Postdevelopment

Summary for Reach 3R: Design point

Inflow Area = 0.830 ac, 47.17% Impervious, Inflow Depth = 0.00" for 10 year event

Routing by Stor-Ind+Trans method

G-10174 Pre Post Drainage Claro

Type III 24-hr 10 year Rainfall=4.70"

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Summary for Pond 4P: Infiltrators

Inflow Area = 0.830 ac, 47.17% Impervious, Inflow Depth = 1.53" for 10 year event
 Inflow = 1.39 cfs @ 12.10 hrs, Volume= 0.106 af
 Outflow = 0.15 cfs @ 13.33 hrs, Volume= 0.106 af, Atten= 89%, Lag= 74.0 min
 Discarded = 0.15 cfs @ 13.33 hrs, Volume= 0.106 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 98.69' @ 13.33 hrs Surf.Area= 2,195 sf Storage= 1,671 cf

Plug-Flow detention time= 110.2 min calculated for 0.105 af (100% of inflow)
 Center-of-Mass det. time= 110.2 min (972.1 - 862.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	97.50'	1,955 cf	33.00'W x 66.50'L x 3.54'H Field A 7,772 cf Overall - 2,884 cf Embedded = 4,889 cf x 40.0% Voids
#2A	98.00'	2,884 cf	Cultec R-330XLHD x 54 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
		4,839 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	97.50'	2.410 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 91.50'

Discarded OutFlow Max=0.15 cfs @ 13.33 hrs HW=98.69' (Free Discharge)

↑1=Exfiltration (Controls 0.15 cfs)

G-10174 Pre Post Drainage Claro

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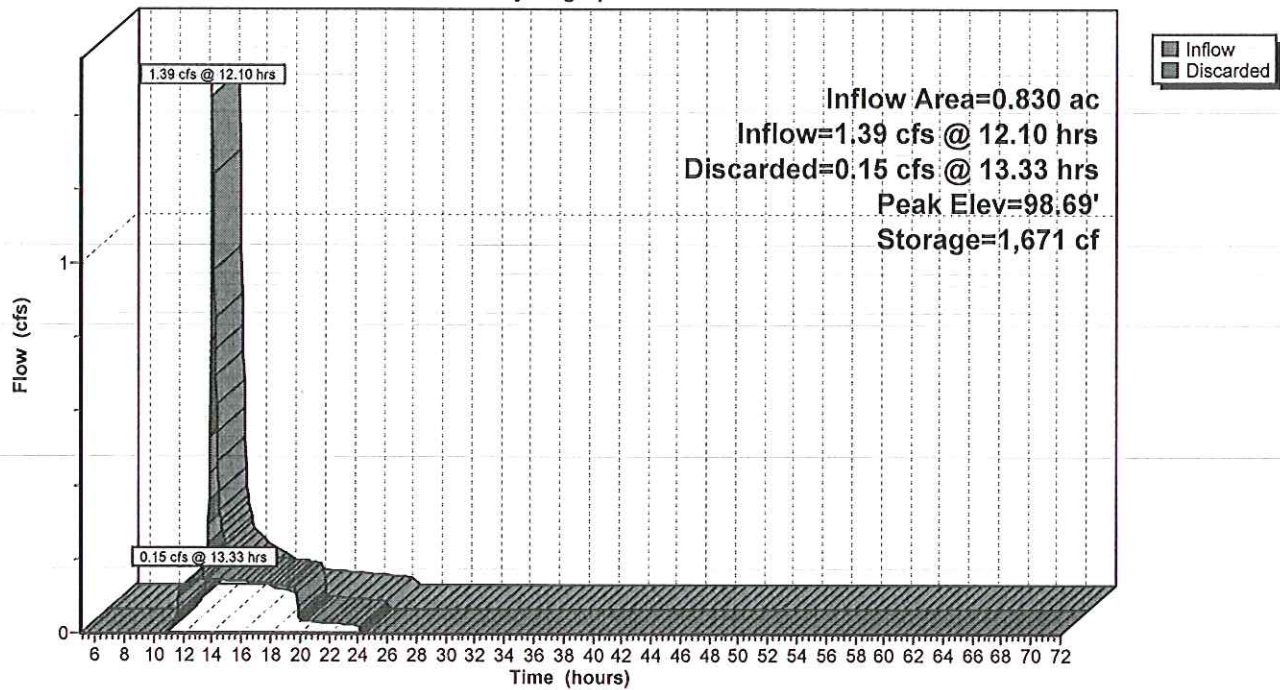
Type III 24-hr 10 year Rainfall=4.70"

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Pond 4P: Infiltrators

Hydrograph



G-10174 Pre Post Drainage Claro

Type III 24-hr 25 year Rainfall=5.30"

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Time span=5.00-72.00 hrs, dt=0.05 hrs, 1341 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Predevelopment

Runoff Area=36,135 sf 5.81% Impervious Runoff Depth=0.10"

Tc=6.0 min UI Adjusted CN=34 Runoff=0.01 cfs 0.007 af

Subcatchment 2S: Postdevelopment

Runoff Area=36,135 sf 47.17% Impervious Runoff Depth=1.94"

Tc=6.0 min CN=66 Runoff=1.79 cfs 0.134 af

Reach 3R: Design point**Pond 4P: Infiltrators**

Peak Elev=99.10' Storage=2,369 cf Inflow=1.79 cfs 0.134 af

Outflow=0.16 cfs 0.134 af

Total Runoff Area = 1.659 ac Runoff Volume = 0.140 af Average Runoff Depth = 1.02"**73.51% Pervious = 1.220 ac 26.49% Impervious = 0.439 ac**

G-10174 Pre Post Drainage Claro

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Type III 24-hr 25 year Rainfall=5.30"

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Summary for Subcatchment 1S: Predevelopment

Runoff = 0.01 cfs @ 15.04 hrs, Volume= 0.007 af, Depth= 0.10"

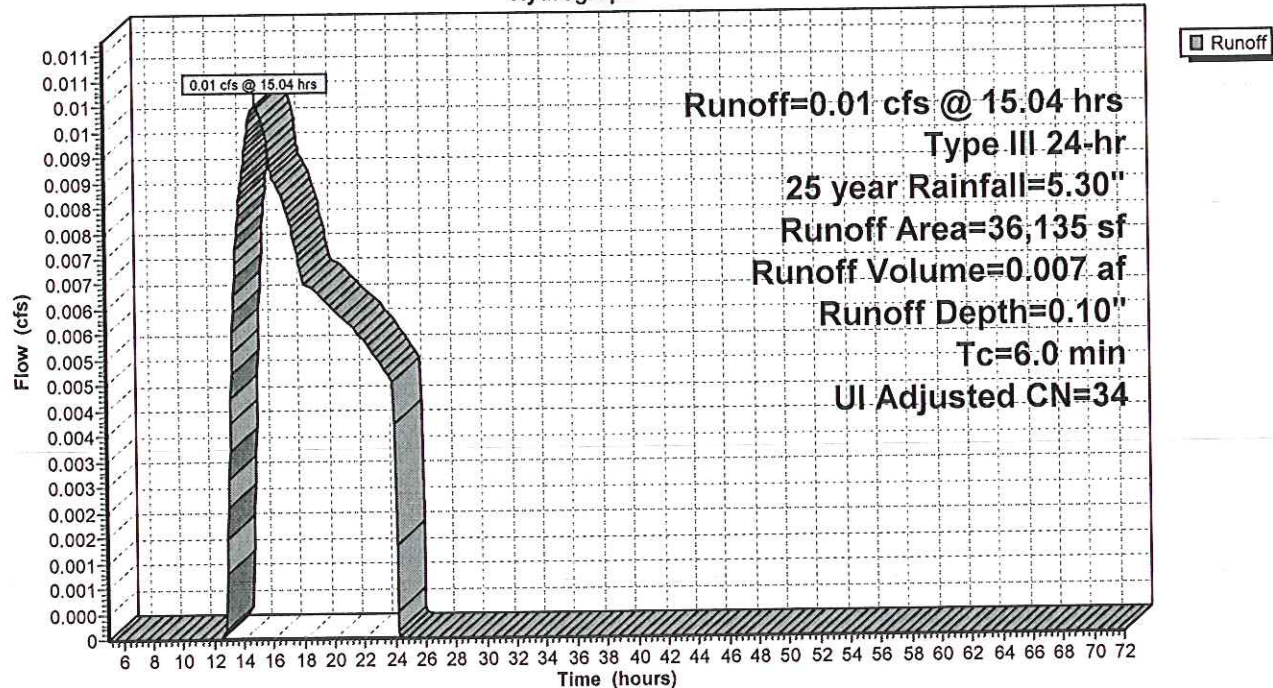
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=5.30"

Area (sf)	CN	Adj	Description
34,035	32		Woods/grass comb., Good, HSG A
1,000	98		Unconnected roofs, HSG A
600	98		Unconnected roofs, HSG A
500	98		Paved parking, HSG A
36,135	36	34	Weighted Average, UI Adjusted
34,035			94.19% Pervious Area
2,100			5.81% Impervious Area
1,600			76.19% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: Predevelopment

Hydrograph



G-10174 Pre Post Drainage Claro

Prepared by {enter your company name here}

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Type III 24-hr 25 year Rainfall=5.30"

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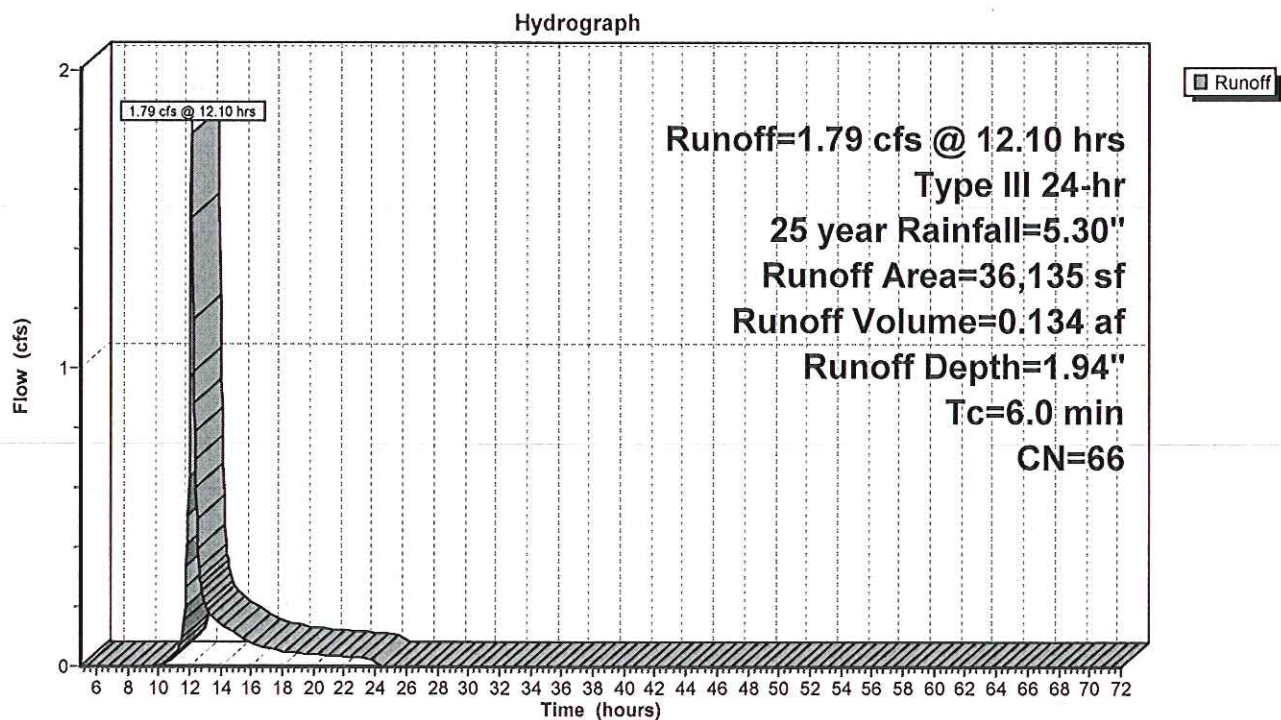
Summary for Subcatchment 2S: Postdevelopment

Runoff = 1.79 cfs @ 12.10 hrs, Volume= 0.134 af, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=5.30"

Area (sf)	CN	Description
6,336	98	Unconnected roofs, HSG A
9,236	98	Paved parking, HSG A
* 1,472	98	Paved parking, HSG A sidewalk
14,741	39	>75% Grass cover, Good, HSG A
4,350	30	Woods, Good, HSG A
36,135	66	Weighted Average
19,091		52.83% Pervious Area
17,044		47.17% Impervious Area
6,336		37.17% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 2S: Postdevelopment

G-10174 Pre Post Drainage Claro

Type III 24-hr 25 year Rainfall=5.30"

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Summary for Reach 3R: Design point

Inflow Area = 0.830 ac, 47.17% Impervious, Inflow Depth = 0.00" for 25 year event

Routing by Stor-Ind+Trans method

G-10174 Pre Post Drainage Claro

Type III 24-hr 25 year Rainfall=5.30"

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Summary for Pond 4P: Infiltrators

Inflow Area = 0.830 ac, 47.17% Impervious, Inflow Depth = 1.94" for 25 year event
 Inflow = 1.79 cfs @ 12.10 hrs, Volume= 0.134 af
 Outflow = 0.16 cfs @ 13.77 hrs, Volume= 0.134 af, Atten= 91%, Lag= 100.6 min
 Discarded = 0.16 cfs @ 13.77 hrs, Volume= 0.134 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 99.10' @ 13.77 hrs Surf.Area= 2,195 sf Storage= 2,369 cf

Plug-Flow detention time= 157.1 min calculated for 0.134 af (100% of inflow)
 Center-of-Mass det. time= 157.0 min (1,011.7 - 854.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	97.50'	1,955 cf	33.00'W x 66.50'L x 3.54'H Field A 7,772 cf Overall - 2,884 cf Embedded = 4,889 cf x 40.0% Voids
#2A	98.00'	2,884 cf	Cultec R-330XLHD x 54 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
		4,839 cf	Total Available Storage

Storage Group A created with Chamber Wizard

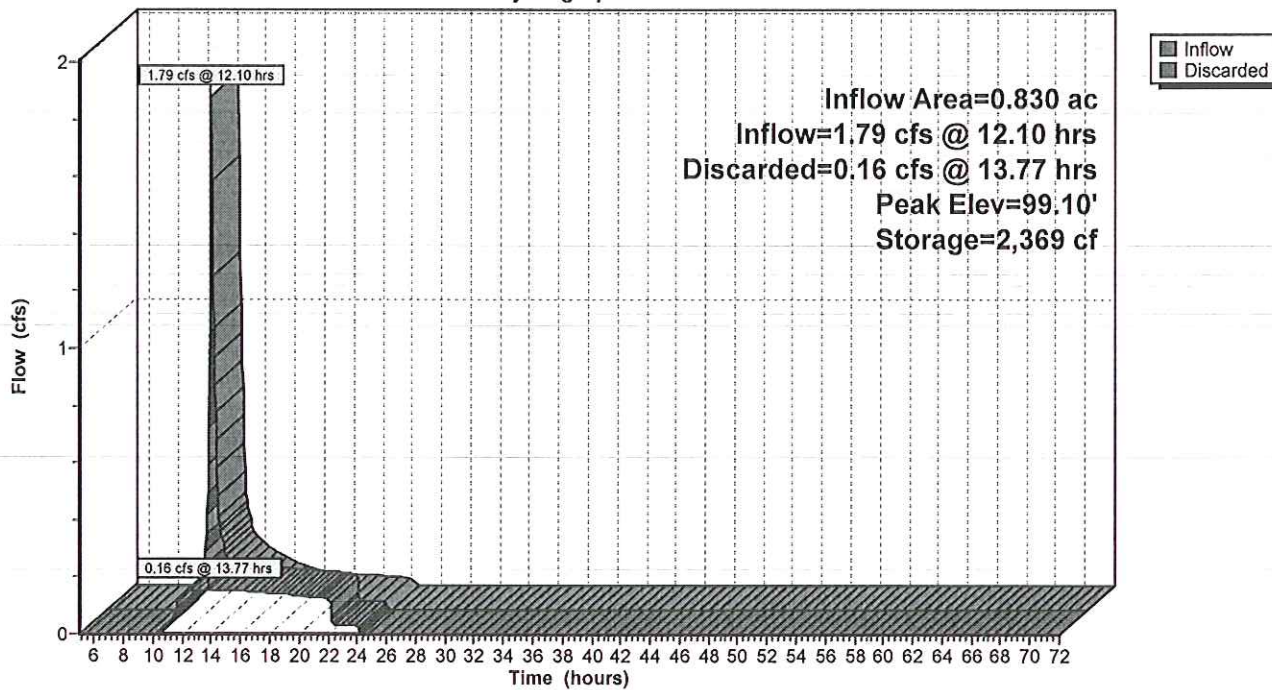
Device	Routing	Invert	Outlet Devices
#1	Discarded	97.50'	2.410 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 91.50'

Discarded OutFlow Max=0.16 cfs @ 13.77 hrs HW=99.10' (Free Discharge)

↑1=Exfiltration (Controls 0.16 cfs)

Pond 4P: Infiltrators

Hydrograph



G-10174 Pre Post Drainage Claro

Type III 24-hr 100 year Rainfall=6.70"

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Time span=5.00-72.00 hrs, dt=0.05 hrs, 1341 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Predevelopment

Runoff Area=36,135 sf 5.81% Impervious Runoff Depth=0.36"
Tc=6.0 min UI Adjusted CN=34 Runoff=0.09 cfs 0.025 af

Subcatchment 2S: Postdevelopment

Runoff Area=36,135 sf 47.17% Impervious Runoff Depth=2.97"
Tc=6.0 min CN=66 Runoff=2.81 cfs 0.205 af

Reach 3R: Design point**Pond 4P: Infiltrators**

Peak Elev=100.37' Storage=4,235 cf Inflow=2.81 cfs 0.205 af
Outflow=0.18 cfs 0.205 af

Total Runoff Area = 1.659 ac Runoff Volume = 0.230 af Average Runoff Depth = 1.66"
73.51% Pervious = 1.220 ac 26.49% Impervious = 0.439 ac

G-10174 Pre Post Drainage Claro

Prepared by {enter your company name here}

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Type III 24-hr 100 year Rainfall=6.70"

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Summary for Subcatchment 1S: Predevelopment

Runoff = 0.09 cfs @ 12.41 hrs, Volume= 0.025 af, Depth= 0.36"

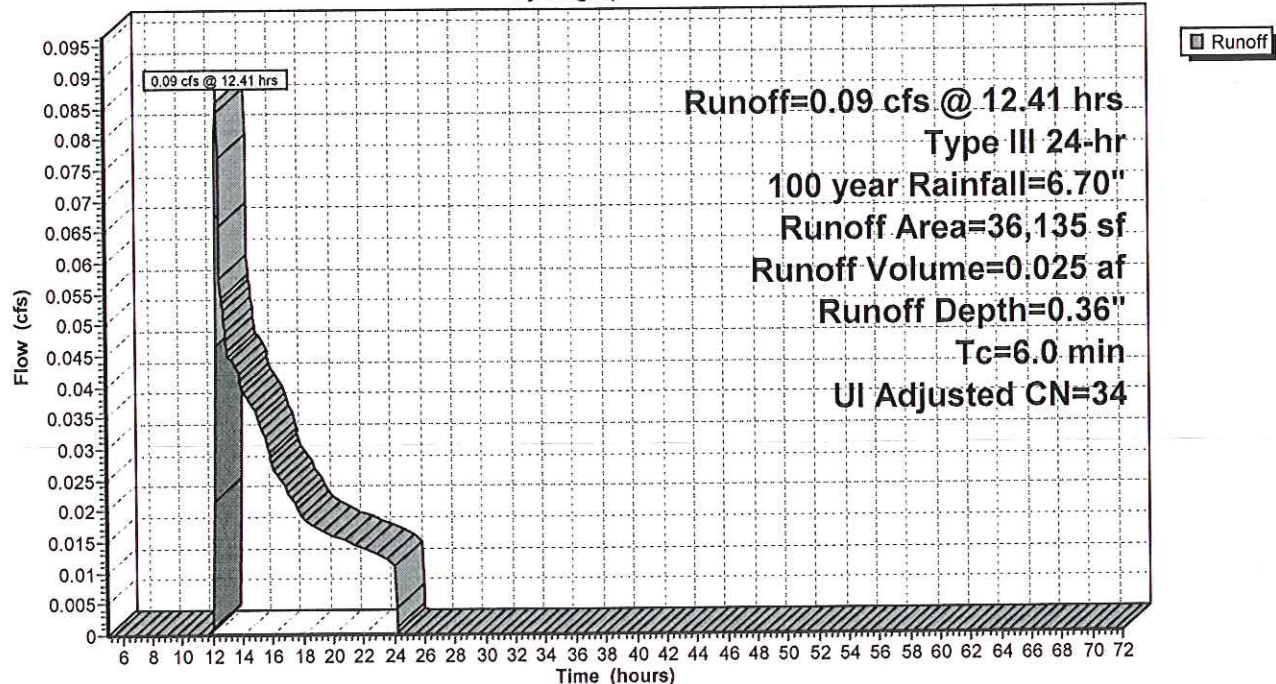
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=6.70"

Area (sf)	CN	Adj	Description
34,035	32		Woods/grass comb., Good, HSG A
1,000	98		Unconnected roofs, HSG A
600	98		Unconnected roofs, HSG A
500	98		Paved parking, HSG A
36,135	36	34	Weighted Average, UI Adjusted
34,035			94.19% Pervious Area
2,100			5.81% Impervious Area
1,600			76.19% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: Predevelopment

Hydrograph



G-10174 Pre Post Drainage Claro

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Type III 24-hr 100 year Rainfall=6.70"

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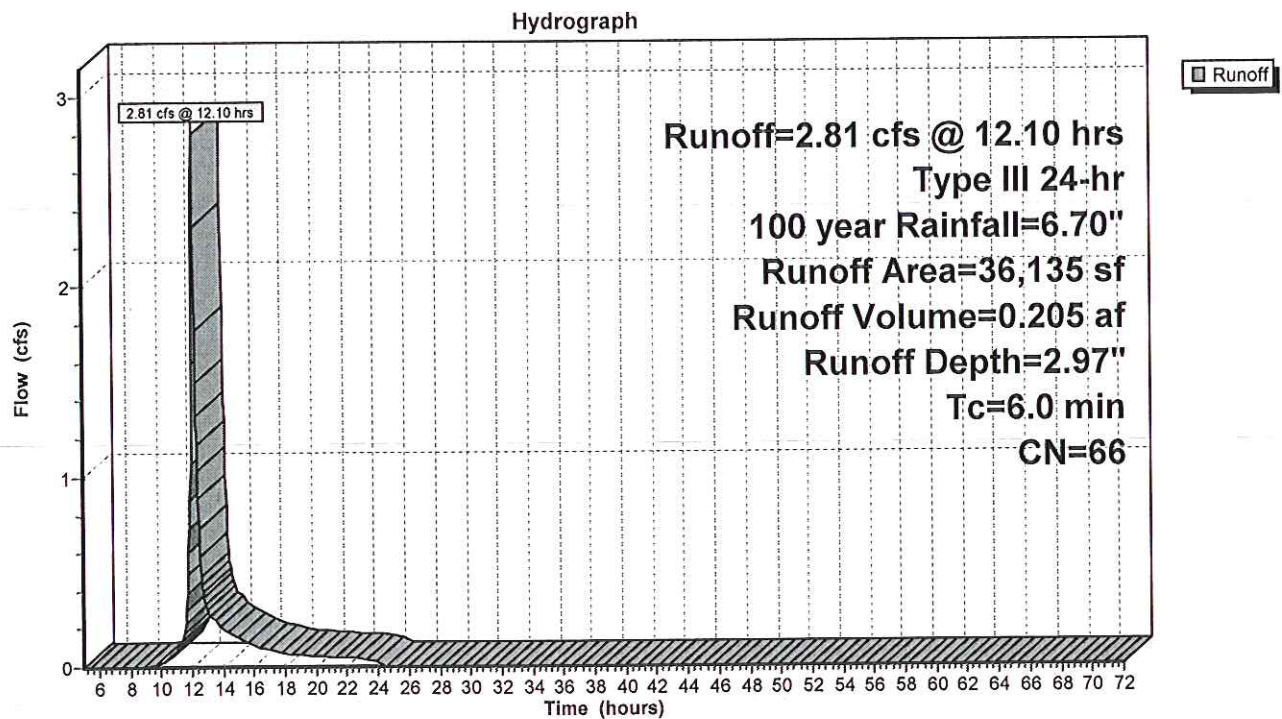
Summary for Subcatchment 2S: Postdevelopment

Runoff = 2.81 cfs @ 12.10 hrs, Volume= 0.205 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=6.70"

Area (sf)	CN	Description
6,336	98	Unconnected roofs, HSG A
9,236	98	Paved parking, HSG A
* 1,472	98	Paved parking, HSG A sidewalk
14,741	39	>75% Grass cover, Good, HSG A
4,350	30	Woods, Good, HSG A
36,135	66	Weighted Average
19,091		52.83% Pervious Area
17,044		47.17% Impervious Area
6,336		37.17% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 2S: Postdevelopment

G-10174 Pre Post Drainage Claro

Type III 24-hr 100 year Rainfall=6.70"

Prepared by {enter your company name here}

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Summary for Reach 3R: Design point

Inflow Area = 0.830 ac, 47.17% Impervious, Inflow Depth = 0.00" for 100 year event

Routing by Stor-Ind+Trans method

G-10174 Pre Post Drainage Claro

Type III 24-hr 100 year Rainfall=6.70"

Prepared by {enter your company name here}

Printed 1/7/2020

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Summary for Pond 4P: Infiltrators

Inflow Area = 0.830 ac, 47.17% Impervious, Inflow Depth = 2.97" for 100 year event
 Inflow = 2.81 cfs @ 12.10 hrs, Volume= 0.205 af
 Outflow = 0.18 cfs @ 14.43 hrs, Volume= 0.205 af, Atten= 94%, Lag= 140.2 min
 Discarded = 0.18 cfs @ 14.43 hrs, Volume= 0.205 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 100.37' @ 14.43 hrs Surf.Area= 2,195 sf Storage= 4,235 cf

Plug-Flow detention time= 261.2 min calculated for 0.205 af (100% of inflow)
 Center-of-Mass det. time= 261.1 min (1,103.1 - 841.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	97.50'	1,955 cf	33.00'W x 66.50'L x 3.54'H Field A 7,772 cf Overall - 2,884 cf Embedded = 4,889 cf x 40.0% Voids
#2A	98.00'	2,884 cf	Cultec R-330XLHD x 54 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
		4,839 cf	Total Available Storage

Storage Group A created with Chamber Wizard

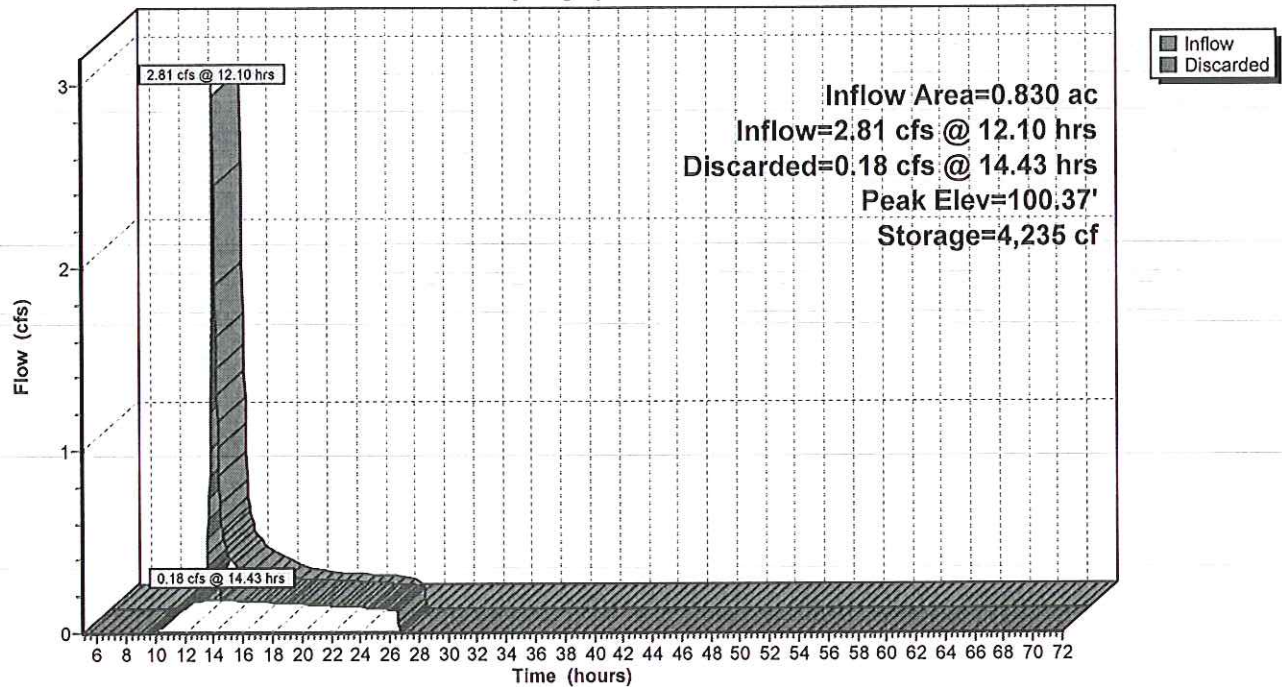
Device	Routing	Invert	Outlet Devices
#1	Discarded	97.50'	2.410 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 91.50'

Discarded OutFlow Max=0.18 cfs @ 14.43 hrs HW=100.37' (Free Discharge)

↑1=Exfiltration (Controls 0.18 cfs)

Pond 4P: Infiltrators

Hydrograph



Drawdown Calculations
Appendix 5

Hydrograph for Pond 4P: Infiltrators

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Discarded (cfs)
5.00	0.00	0	97.50	0.00
7.50	0.00	0	97.50	0.00
10.00	0.02	5	97.51	0.02
12.50	0.73	3,527	99.82	0.17
15.00	0.16	4,211	100.34	0.18
17.50	0.08	3,619	99.88	0.17
20.00	0.06	2,714	99.30	0.16
22.50	0.04	1,783	98.76	0.15
25.00	0.00	734	98.16	0.14
27.50	0.00	0	97.50	0.00
30.00	0.00	0	97.50	0.00
32.50	0.00	0	97.50	0.00
35.00	0.00	0	97.50	0.00
37.50	0.00	0	97.50	0.00
40.00	0.00	0	97.50	0.00
42.50	0.00	0	97.50	0.00
45.00	0.00	0	97.50	0.00
47.50	0.00	0	97.50	0.00
50.00	0.00	0	97.50	0.00
52.50	0.00	0	97.50	0.00
55.00	0.00	0	97.50	0.00
57.50	0.00	0	97.50	0.00
60.00	0.00	0	97.50	0.00
62.50	0.00	0	97.50	0.00
65.00	0.00	0	97.50	0.00
67.50	0.00	0	97.50	0.00
70.00	0.00	0	97.50	0.00

TSS Removal Worksheet
Appendix 6

Long Term Operation and Maintenance Plan

Appendix 7

The following shall serve as the (O&M) Plan required by Standard 9, as well as the Long Term Pollution Prevention Plan required by Standard 4.

A. Names of Persons or Entity Responsible for Plan Compliance;

Applicant: 274 Providence Road LLC
27 Shadowbrook Lane
Apartment 5
Milford, MA 01757
774-248-0192

B. Good housekeeping practices

1. Maintain site, landscaping and vegetation.
2. Sweep and pick up litter on pavements and grounds.
3. Deliveries shall be monitored by owners or representative to ensure that if any spillage occurs, it shall be contained and cleaned up immediately.
4. Maintain pavement and curbing in good repair.

C. Requirements for routine inspections and maintenance of stormwater BMPs

1. Plans: The stormwater Operation and Maintenance Plan shall consist of all Plans, documents and all local state and federal approvals as required for the subject property.
2. Record Keeping:
 - a. Maintain a log of all operation and maintenance activities for at least three years following construction, including inspections, repairs, replacement and disposal (for disposal, the log shall indicate the type of material and the disposal location);
 - b. Make this log available to MassDEP and the Conservation Commission upon request; and
 - c. Allow MassDEP and the Conservation Commission to inspect each BMP to determine whether the responsible party is implementing the Operation and Maintenance Plan.
3. Descriptions and Designs: The Best Management Practices (BMP) incorporated into the design include the following;
 - a. Street Sweeping – Stipulated within the Construction Period Pollution Prevention Plan, the Long Term Pollution Prevention Plan, and the Operation and Maintenance Plan. As the amount of TSS removal is discretionary, no credit was taken within the calculations for this BMP.
 - b. Deep sump catch basins with hoods installed to promote TSS Removal of solids and control floatable pollutants. This BMP has a design rate of 25% TSS Removal.
 - c. Stormwater treatment unit M.H. with a design rate of 80% TSS Removal.
 - d. Infiltration chambers to provide the required recharge from runoff. Refer to TSS Removal Worksheet in Standard 4 for treatment train.
4. BMP Maintenance: After construction it is the responsibility of the owner to perform maintenance. The cleaning of the components of the stormwater management system shall generally be as follows:
 - a. Roadway: The owner shall keep the roadway swept with a mechanical sweeper or hand swept semi-annually at a minimum.
 - b. Catch Basins: Shall be cleaned by excavating, pumping or vacuuming. The sediment shall be disposed of off-site by the Owner. Inspect quarterly, remove silt when ¼ full.
 - c. Stormwater treatment unit shall be inspected and cleaned in accordance with manufacturers recommendations.

- d. Infiltration Chambers: Inspect twice per year and after every major event for the first few months.
- 5. Access Provisions: All of the components of the storm water system will be accessible by the Owner
- D. Spill prevention and response plans
 - 1. Inventory materials to be present on site during construction.
 - 2. Train employees and subcontractors in prevention and clean up procedures.
 - 3. All materials stored on site will be stored in their appropriate containers under a roof.
 - 4. Follow manufacturers recommendation for disposal of used containers.
 - 5. Store only enough product on site to do the job.
 - 6. On site equipment, fueling and maintenance measures:
 - a. Inspect on-site vehicles and equipment daily for leaks.
 - b. Conduct all vehicle and equipment maintenance and refueling in one location, away from storm drains.
 - c. Perform major repairs and maintenance off site.
 - d. Use drip pans, drip cloths or absorbent pads when replacing spent fuels.
 - e. Collect spent fuels and remove from site.
 - 7. Clean up spills.
 - a. Never hose down "dirty" pavement or impermeable surfaces where fluids have spilled. Use dry clean up methods (sawdust, cat litter and/or rags and absorbent pads).
 - b. Sweep up dry materials immediately. Never wash them away or bury them.
 - c. Clean up spills on dirt areas by digging up and properly disposing of contaminated soil.
 - d. Report significant spills to the Fire Department, Conservation Commission and Board of Health.
- E. Provisions for maintenance of lawns, gardens, and other landscaped areas

Use only organic fertilizer. Dispose of clippings outside of the 100 foot buffer zone to the adjacent wetland.
- F. Requirements for storage and use of herbicides, and pesticides

The application of herbicides or pesticides will be done by professional certified contractor.
- G. Provisions for operation and management of septic system

Site to be serviced by municipal sewer.
- H. Provisions for solid waste management
 - 1. Waste Management Plan
 - a. Dumpster for trash and bulk waste collection shall be stored inside or under a roof.
 - b. Recycle materials whenever possible (paper, plaster cardboard, metal cans). Separate containers for material is recommended.
 - c. Do not bury waste and debris on site.
 - d. Certified haulers will be hired to remove the dumpster container waste as needed. Recycling products will also be removed off site weekly.
- I. Snow disposal and plowing plans relative to Wetland Resource Areas

Snow storage is adequate around the site for large storm events.
- J. Winter Road Salt and/or Sand Use and Storage restrictions

No sand, salt, or chemicals for de-icing will be stored outside.

K. Street sweeping schedules

Sweeping, the act of cleaning pavement can be done by mechanical sweepers, vacuum sweeper or hand sweeper. The quantity of sand is a direct correlation with the treatment of ice and snow and the types of chemicals and spreaders that are being used on site to manage snow. If a liquid de-icer such as calcium chloride is used as a pretreatment to new events the amount of sand is minimized. Sweeping for this site should be done semi-annually at a minimum. Collecting the particulate before it enters the catch basins is cheaper and more environmentally friendly than in a catch basin mixing with oils and greases in the surface water runoff in catch basins.

L. Provisions for prevention of illicit discharges to the stormwater management system

The discharge into the stormwater system is not being violated, see attachment for illicit discharges compliance.

M. Training the staff or personnel involved with implementing Long-Term Pollution Prevention Plan

The owner shall develop policies and procedures for containing the illicit spilling of oils, soda, beer, paper and litter. These wastes provide a degrading of the water quality. The placement of signs and trash barrels with lids around the site would contribute to a clean water quality site conditions.

N. List of Emergency contacts for implementing Long-Term Pollution Prevention Plan:

274 Providence Road LLC
27 Shadowbrook Lane
Apartment 5
Milford, MA 01757
774-248-0192

This shall be the contact until such time as the project is sold.

Construction Period Pollution Prevention Plan
Appendix 8

Construction Period Pollution Prevention Plan and Erosion and Sedimentation Control.
EPA NPDES – Storm Water Pollution Prevention Plan (SWPPP)

A. Names of Persons or Entity Responsible for Plan Compliance

Applicant: 274 Providence Road LLC
27 Shadowbrook Lane
Apartment 5
Milford, MA 01757
774-248-0192

B. Construction Period Pollution Prevention Measures

1. Inventory materials to be present on site during construction.
2. Train employees and subcontractors in prevention and clean up procedures.
3. All materials stored on site will be stored in their appropriate containers and if possible under a roof or covered.
4. Follow manufacturer's recommendation for disposal of used containers.
5. Store only enough product on site to do the job.
6. On site equipment, fueling and maintenance measures:
 - a. Inspect on-site vehicles and equipment daily for leaks.
 - b. Conduct all vehicle and equipment maintenance and refueling in front of building, away from storm drains.
 - c. Perform major repairs and maintenance off site.
 - d. Use drip pans, drip cloths or absorbent pads when replacing spent fuels.
 - e. Collect spent fuels and remove from site, per Local and State regulations.
 - f. Maintain a clean construction entrance where truck traffic is frequent to reduce soil compaction constant sweeping is required and limit tracking of sediment into streets, sweeping street when silt is observed on street.
7. Stock pile materials and maintain Erosion Control around the materials where it can easily be accessed. Maintain easy access to clean up materials to include brooms, mops, rags gloves, goggles, sand, sawdust, plastic and metal trash containers.
8. Clean up spills.
 - a. Never hose down "dirty" pavement or impermeable surfaces where fluids have spilled. Use dry clean up methods (sawdust, cat litter and/or rags and absorbent pads).
 - b. Sweep up dry materials immediately. Never wash them away or bury them.
 - c. Clean up spills on dirt areas by digging up and properly disposing of contaminated soil in a certified container and notify a certified hauler for removal.
 - d. Report significant spills to the Fire Department.
9. It is the responsibility of the site superintendent or employees designated by the Applicant to inspect erosion control and repair as needed, also to inspect all on site vehicles for leaks and check all containers on site that may contain hazardous materials daily.

C. Erosion and Sedimentation Control Plan;

1. See Site Plan prepared by Guerriere & Halnon, Inc. Dated 10/24/19

D. Site Development Plans;

1. See Site Plan prepared by Guerriere & Halnon, Inc. Dated 10/24/19

E. Construction Plans

See Site Plan prepared by Guerriere & Halnon, Inc. Dated 10/24/19

- a. Record Order of Conditions - The site superintendent shall be aware of all the Conditions contained within the Order including inspection schedules. If the site is not under the jurisdiction of the Conservation Commission, then items in reference to the Conservation Commission do not apply.
- b. Install DEP File # Sign.
- c. Prior to any work on the site including tree/brush clearing, the approved limit of clearing as well as the location of the proposed erosion control devices (such as silt fence/straw bales, etc.) must be staked on the ground under the direction of a Massachusetts registered Professional Land Surveyor.
- d. Install silt fence/hay bales at locations
- e. Strip off top and subsoil. Stockpile material to be reused away from the wetland, remove excess material from the site. Install and maintain erosion control barrier around stockpile.
- f. Rough grade site, maintaining a temporary low area/sediment trap away from the wetland.
- g. Construct drainage outfalls and stilling basin. Stabilize side slopes with loam, seed and mulch.
- h. Install underground utilities; protect all open drainage structures with erosion/siltation control devices.
- i. Install binder course of bituminous asphalt.
- j. Install wearing course of asphalt, and striping (where required).
- k. Maintain all erosion control devices until site is stabilized and a Certificate of Compliance is issued by the Conservation Commission.
- l. The Contractor shall be responsible to schedule any required inspections of his/her work.

F. Construction Waste Management Plan

- a. Dumpster for trash and bulk waste collection shall be provided separately for construction.
- b. Recycle materials whenever possible (paper, plaster cardboard, metal cans). Separate containers for material are recommended.
- c. Segregate and provide containers for disposal options for waste.
- d. Do not bury waste and debris on site.
- e. Certified haulers will be hired to remove the dumpster container waste as needed. Recycling products will also be removed off site weekly.
- f. The sewer system is only for disposal of human waste, and substances permitted for disposal in the site sewer permit with the Town B.O.H..

G. Operation and Maintenance of Erosion and Sedimentation Controls

The operation and maintenance of sedimentation control shall be the responsibility of the contractor. The inspection and maintenance of the stormwater component shall be performed as noted below. The contractor shall have erosion control in place at all times. The contractor, based on future weather reports, shall prepare and inspect all erosion control devices; cleaning, repairing and upgrading is a priority so that the devices perform as per design. Inspect the site during rain events. Don't stay away from the site. At a minimum there should be inspection to assure the devices are not clogged or plugged, or that devices have not been destroyed or damaged during the rain event. After a storm event inspection is required to clean and repair any damage components. Immediate repair is required.

H. Inspection and Maintenance Schedules

1. Inspection must be conducted at least once every 7 days and within 24 hours of the end of a storm event 0.5 inches or greater.

2. Inspection frequency can be reduced to once a month if:
 - a. The site is temporarily stabilized.
 - b. Runoff is unlikely due to winter conditions, when site is covered with snow or ice.
3. Inspections must be conducted by qualified personnel, "qualified personnel" means a person knowledgeable in the principles and practice of erosion and sediment controls and who possess the skills to assess the conditions and take measures to maintain and ensure proper operation, also to conclude if the erosion control methods selected are effective.
4. For each inspection, the inspection report must include: (See attached inspection and maintenance log)
 - a. The inspection date.
 - b. Names, titles of personnel making the inspection.
 - c. Weather information for the period since the last inspection.
 - d. Weather information at the time of the inspection.
 - e. Locations of discharges of sediment from the site, if any.
 - f. Locations of BMP's that need to be maintained.
 - g. Locations where additional BMP's may be required.
 - h. Corrective action required or any changes to the SWPPP that may be necessary.
5. The owner, or their representative, such as the contractor, shall inspect the following in-place work;

Inspection Schedule:

Erosion Control	Weekly
Catch Basins	Weekly
Temporary Sedimentation Traps/Basins	Weekly
Street Sweeping	Weekly

Please Note: Special inspections shall also be made after a significant rainfall event.

Maintenance Schedule

Erosion Control Devices Failure	Immediately
Catch Basins	Sump 1/4 full of sediment
Water Quality Manhole	As needed
Street Sweeping	14 days minimum and prior to any significant rain event.

Please Note: Special maintenance shall also be made after a significant rainfall event.

I. Inspection and Maintenance Log Form. (Log Form Follows)

Illicit Discharge Statement
Appendix 9

Illicit Discharge Compliance Statement

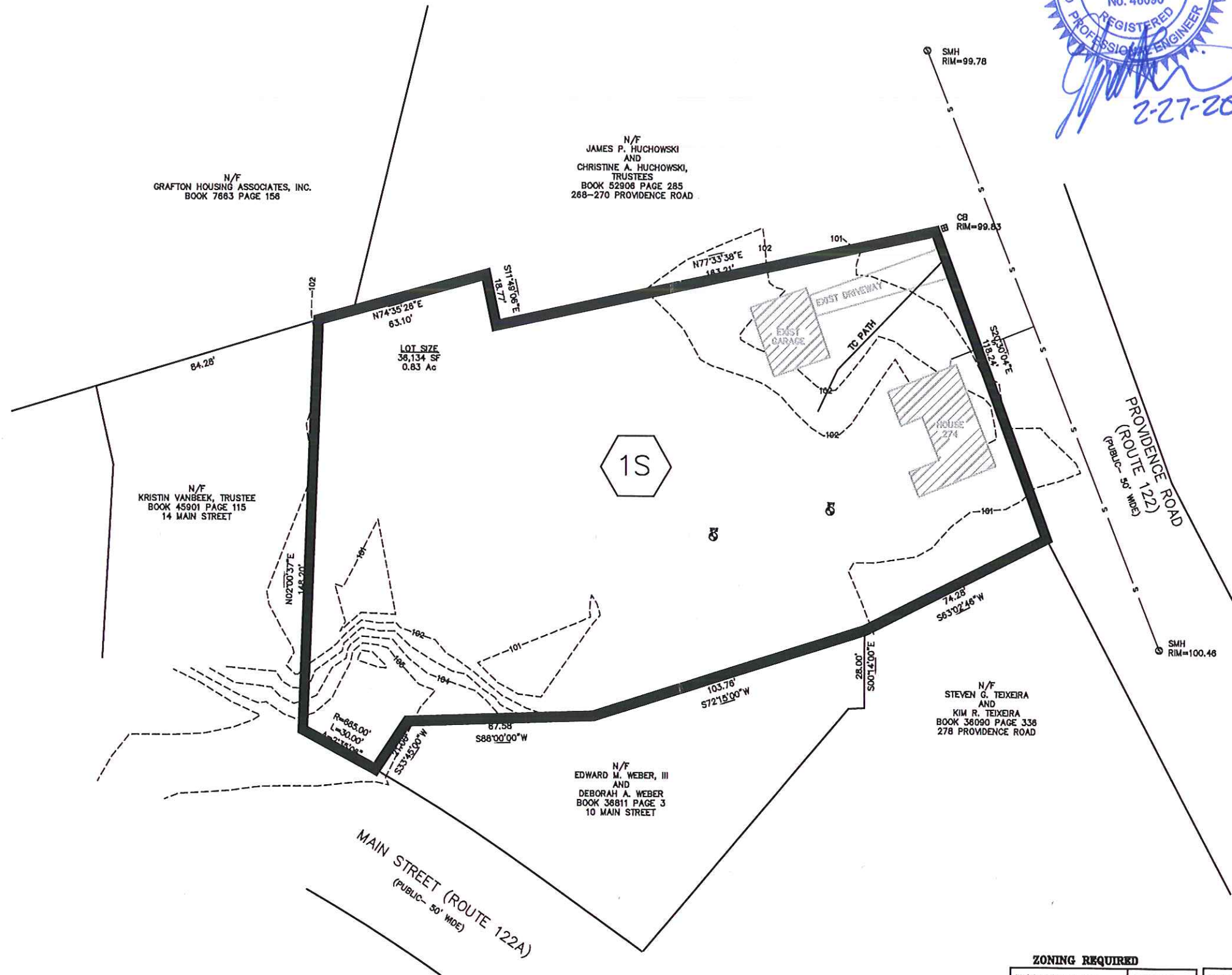
It is the intent of the Applicant Essex Group Management, 57 Summer Street, Rowley MA 01960, 508-948-7383 to control illicit disposal into the storm drainage system. There will be no connection to the storm water system to inadvertently direct other types of liquids, chemicals or solids into the storm drainage system. The Applicant will also promote a clean green environment by mitigating spills onto pavements; oils, chemicals, pet waste, debris and litter.

Respectfully Acknowledged,

A handwritten signature in blue ink, appearing to read "David Ellis", is written over a horizontal line.

Providence Street Village, Inc.

Drainage Area Plan
Appendix 10



N/F
JAMES P. HUCHOWSKI
AND
CHRISTINE A. HUCHOWSKI,
TRUSTEES
BOOK 52908 PAGE 285
268-270 PROVIDENCE ROAD

N/F
GRAFTON HOUSING ASSOCIATES, INC.
BOOK 7663 PAGE 158

N/F
KRISTIN VANBEEK, TRUSTEE
BOOK 45901 PAGE 115
14 MAIN STREET

N/F
STEVEN G. TEIXEIRA
AND
KIM R. TEIXEIRA
BOOK 36090 PAGE 336
278 PROVIDENCE ROAD

N/F
EDWARD M. WEBER, III
AND
DEBORAH A. WEBER
BOOK 38811 PAGE 3
10 MAIN STREET

ZONING REQUIRED

VILLAGE MIXED USE	REQUIRED	ATTACHED SINGLE FAMILY DWELLING	REQUIRED
AREA	20,000 SF	AREA	1,200 SF
FRONTAGE	100 FT	FRONTAGE	18 FT MIN/24 FT MAX
FRONT YARD	NONE	FRONT YARD	5 FT MIN/15 FT MAX
SIDE YARD	15 FT	SIDE YARD	0 FT
REAR YARD	15 FT	REAR YARD	15 FT
HEIGHT	40 FT		
MAXIMUM LOT COVERAGE	75%		

DATE: _____
APPROVED DATE: _____
PLANNING BOARD

SIGNATURE DATE: _____
BEING A MAJORITY

NOTES

1. CONSTRUCTION ON THIS LOT IS SUBJECT TO ANY EASEMENTS, RIGHTS-OF-WAY, RESTRICTIONS, RESERVATIONS OR OTHER LIMITATIONS WHICH MAY BE REVEALED BY AN EXAMINATION OF THE TITLE.

2. "WARNING" EXISTING UTILITY LINES INDICATED OR NOTED ON THESE DRAWINGS ARE SHOWN AS OBTAINED FROM EXISTING INFORMATION AND ARE ONLY APPROXIMATE IN LOCATION. THE CONTRACTOR SHALL TAKE CAUTION IN THESE AREAS TO AVOID DAMAGE TO EXISTING UTILITY LINES AND/OR HARM TO PERSONNEL ENGAGED IN WORKING IN THESE AREAS. CALL "DIG SAFE" 1-888-DIG-SAFE (1-888-344-7233). EXISTING LINES OTHER THAN THOSE INDICATED ON THESE DRAWINGS MAY BE ON THE SITE. THE CONTRACTOR IS WARNED TO PROCEED WITH CAUTION WITH ALL WORK, ESPECIALLY EXCAVATION WORK, AND TO MAKE ALL POSSIBLE INVESTIGATIONS AS TO POSSIBLE UNMARKED UTILITY LINES.

NOTES

1) SEE THE FOLLOWING PLANS RECORDED AT THE WORCESTER DISTRICT REGISTRY OF DEEDS-

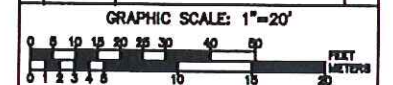
PLAN BOOK 336 PLAN 54 JUNE 1970
PLAN BOOK 211 PLAN 15 DECEMBER 1955
PLAN BOOK 210 PLAN 48 OCTOBER 1955
PLAN BOOK 194 PLAN 14 NOVEMBER 1953

2) THIS PLAN HAS BEEN COMPILED FROM VARIOUS SOURCES OF INFORMATION AND IS SUBJECT TO SUCH FACTS AS A FIELD SURVEY MAY DISCLOSE.

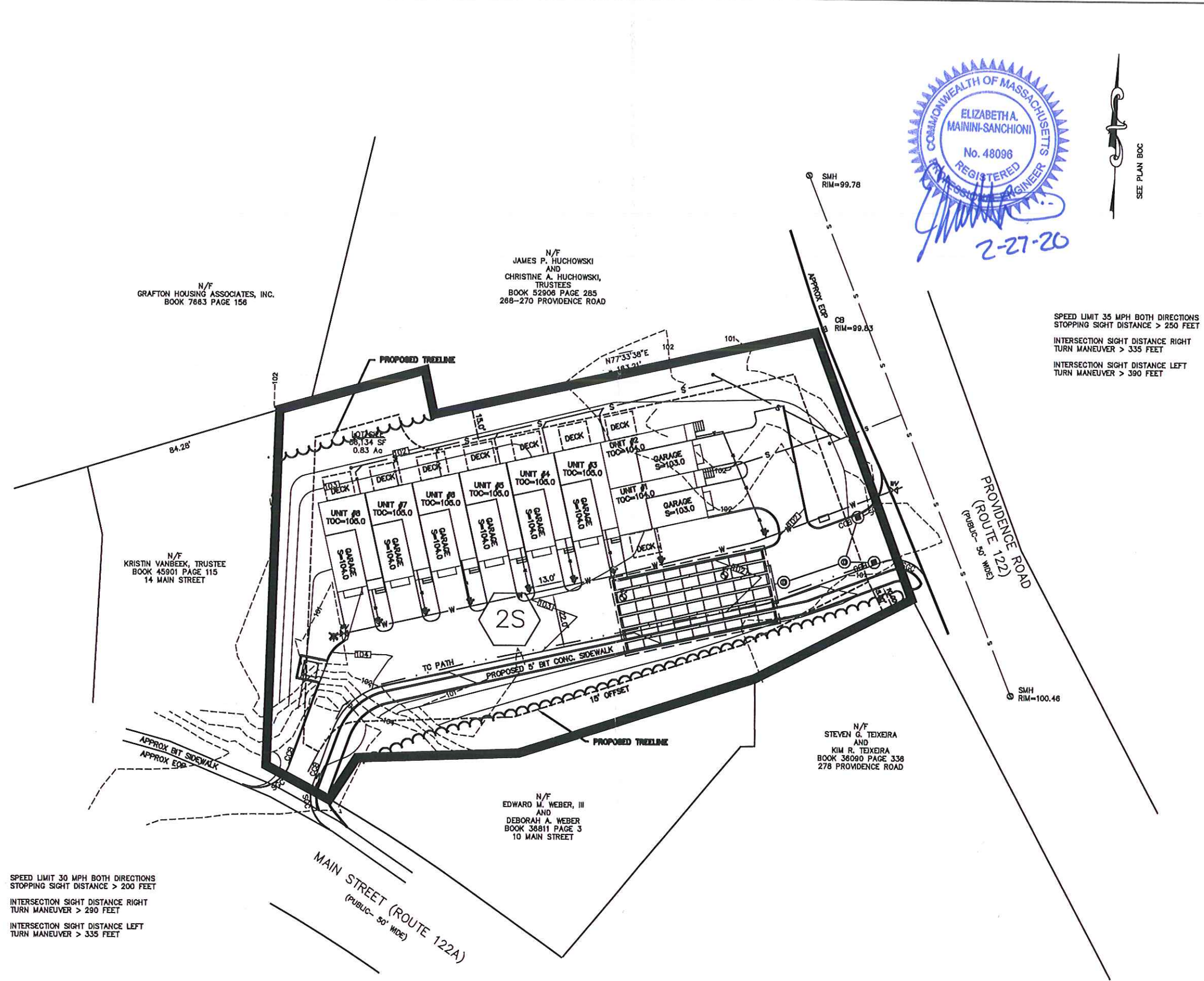
OWNER:
274 PROVIDENCE RD LLC
27 SHADOWBROOK LANE
APT 5
MILFORD MA 01757

PREDEVELOPMENT PLAN
274 PROVIDENCE ROAD
(ROUTE 122)
GRAFTON, MASS.
SCALE: 1"=20'
DATE: NOVEMBER 12, 2019

00	DATE	INITIAL SUBMITTAL	INIT



Guerriere & Halnon, Inc.
ENGINEERING & LAND SURVEYING
333 WEST STREET PH. (508) 473-6630
MILFORD, MA 01757 FX. (508) 473-8243
www.gandhengineering.com



SEE PLAN BOC

SPEED LIMIT 35 MPH BOTH DIRECTIONS
STOPPING SIGHT DISTANCE > 250 FEET
INTERSECTION SIGHT DISTANCE RIGHT
TURN MANEUVER > 335 FEET
INTERSECTION SIGHT DISTANCE LEFT
TURN MANEUVER > 390 FEET

SPEED LIMIT 30 MPH BOTH DIRECTIONS
STOPPING SIGHT DISTANCE > 200 FEET
INTERSECTION SIGHT DISTANCE RIGHT
TURN MANEUVER > 290 FEET
INTERSECTION SIGHT DISTANCE LEFT
TURN MANEUVER > 335 FEET

DATE: _____ DATE: _____
APPROVED DATE: _____
PLANNING BOARD

SIGNATURE DATE: _____
BEING A MAJORITY

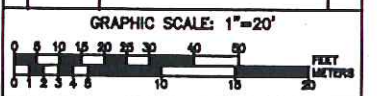
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OWNER:
274 PROVIDENCE RD LLC
27 SHADOWBROOK LANE
APT 5
MILFORD MA 01757

POST DEVELOPMENT
274 PROVIDENCE ROAD
(ROUTE 122)
GRAFTON, MASS.
SCALE: 1"=20'
DATE: NOVEMBER 12, 2019

NO	DATE	INITIAL SUBMITTAL	INIT



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